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EXPLORATION, AND THE DEVELOP-
MENT OF PUBLIC EDUCATION
THROUGH THE MUSEUM



AFRICAN NUMBER

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NOVEMBER-DECEMBER, 1927

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THE PEAK OF MT. MIKENO AT SUNSET

Printed by W. R. Leigh while on the Eastman-Pomeroy-Akeley East African Expedition of 1926-27

NATURAL HISTORY

VOLUME XXVII

NOVEMBER-DECEMBER, 1927

NUMBER 6

The Vanishing Wild Life of Africa

By HENRY FAIRFIELD OSBORN

President of the American Museum of Natural History

As clearly explained in previous numbers of *NATURAL HISTORY* and more fully in the present number, the dominant motive in the African Hall is the lifelike and artistic presentation and preservation for all time of the manifold forms of animal and plant life now sorely threatened with reduction or actual extinction. The ideals of this great Hall seem now destined of fulfillment and, when carried into execution as we hope within the next decade, will through the creation of a new and nobler sentiment tend to check the present wanton destruction of African life.

THE biography of a great continent cannot be fully written in the words of a naturalist or depicted by the brush of an artist even as gifted as Millais, the author of *A Breath from the Veldt*. It is fortunate that hundreds of explorers, sportsmen, and naturalists have recorded the tremendous impression made by the wondrous life of Africa as it was before man, the great destroyer, entered this earthly paradise. It is fortunate that through early travelers and explorers, we know of the myriads of superb animals, many, like the quagga, now extinct, which roamed the arid plains of South Africa. A few quadrupeds surviving in the South African preserves and the vast surrounding wastes, wholly swept clear of life, give us a pathetic picture of the doom which is awaiting their noble fellow species of the North. Only a palaeontologist like myself can measure the full extent of the coming calamity to science and to art when the entire wild life of Africa shall have vanished and the few remaining remnants shall survive securely in the state and national preserves established by England and Belgium.

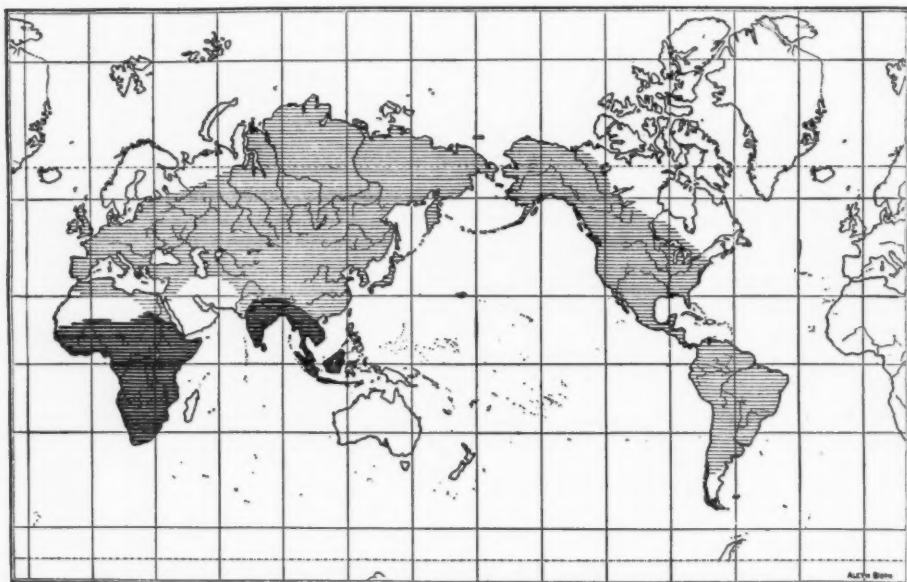
Also a palaeontologist alone can realize to the full that a million years ago the entire world, including every

continent, was filled with these glorious animals which it had taken millions of previous years to create. For example, when we first observe the tiny ancestral mastodon without tusks or proboscis, barely a yard in height, which browsed along the river-sides of northern Africa and gave birth to the entire order of Proboscidea, can we appreciate to the full the majesty and dignity of the existing African elephant, with its superb tusks, marvelously muscular trunk, and noble stature.

In Africa alone, of all the continents, there survive the chief offspring of 30,000,000 years of mammalian evolution.

It is fortunate that during the years 1895-96 Carl Akeley himself received the full and great impression of the wondrous life and surrounding scenes of Africa during the Field Museum Expedition, under the leadership of our Daniel Giraud Elliot,¹ for, even thirty years ago, it was not fully apparent with what rapidity the teeming life of a great continent can be destroyed by modern firearms and other methods of elimination. Even so late as 1912, when Akeley returned to Africa to secure the great African elephant

¹Originator of the American Museum Bird Collections; for a twelve-year period (1894-1906) Curator in the Field Museum.



Worldwide former distribution of the Proboscidea, elephants and mastodons, indicated in light shaded lines. Present geographic distribution of the surviving proboscideans in heavy shading; the African elephant, *Loxodonta*, in Africa, the Indian elephant, *Elephas*, in Southern Asia. In past time the Proboscidea included 13 families, 60 genera, and 350 species. The order is now reduced to 2 genera, 2 species, divided into fairly numerous subspecies

group, the coming doom of the African game mammals was not fully apparent. The recent Report of the Eastman-Pomeroy-Akeley East African Expedition of 1926-1927 is full of observations of the destruction which has taken place during the last fifteen years, as the following excerpt shows.

Mr. Akeley soon found exactly the location he had in mind for the Klipspringer Group—a kopje, which consisted of up-heaved rocks of remarkable contour and of vivid color decorated with moss, flowers, shrubs and rank-growing grass, the typical home of the tiny, rock-dwelling antelope, the klipspringer. Below, on all sides, extended the vast plains of Africa, where once the great game herds ranged in tens of thousands, but where today, tragically enough, they have practically vanished. On the far northern horizon when it was very clear and when, as rarely occurs, there was no atmospheric haze, we could see Mt. Kenya's sharp pinnacle and glacier. Almost the same distance away to the south, Kilimanjaro's snowy dome was visible. A profusion of multi-colored flowers and a great

variety of tropical birds surrounded us. The two artists spent every available moment in making color records of everything from the shrubs and tiny flowers to be reproduced in the group, to the landscapes to be used as studies for the background.

It is paragraph reveals the full biographic purpose of the African Hall. Millais in his delightful *A Breath from the Veldt* had described and depicted the marvelous leaps of the klipspringer (*Oreotragus oreotragus*), the supreme saltator or jumper of the animal world. But here, in the fulfillment of Akeley's dream, is the nature lover, the naturalist, the taxidermist, the botanist, the artist, in conspiracy to reproduce the entire beauty of perfect animal form, of light, of color, of atmosphere, even of the distant snowy dome of Kilimanjaro!

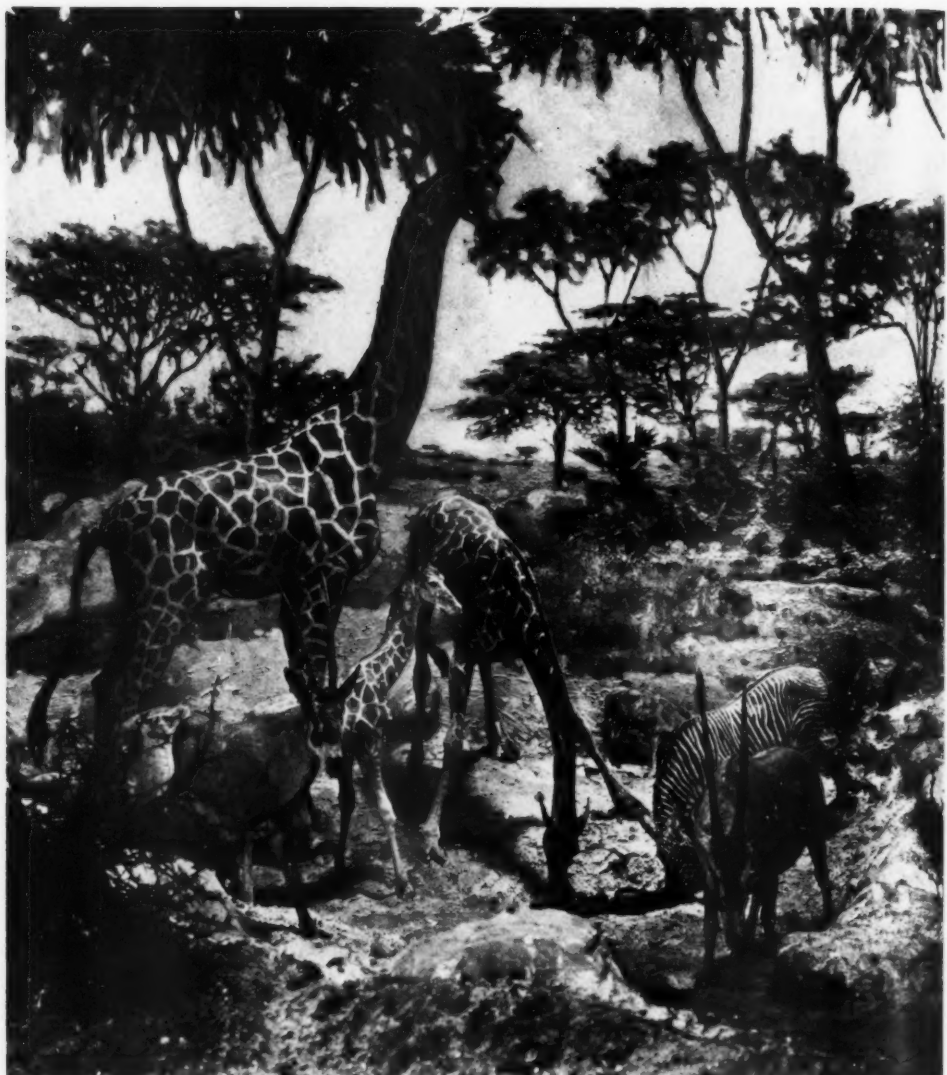
The beauty and romance of these animals are so enthralling that even the Museum collector is held back from the



Model for the Gorilla Group prepared under the direction of James L. Clark, assistant director. The gorillas were obtained by Carl Akeley on a special trip to Africa in 1921. On his return he personally prepared and mounted the animals. The background was painted from color studies by W. R. Leigh



Model for the Buffalo Group, prepared by Robert H. Rockwell under the direction of James L. Clark, assistant director. Foreground and background from the color studies of W. R. Leigh



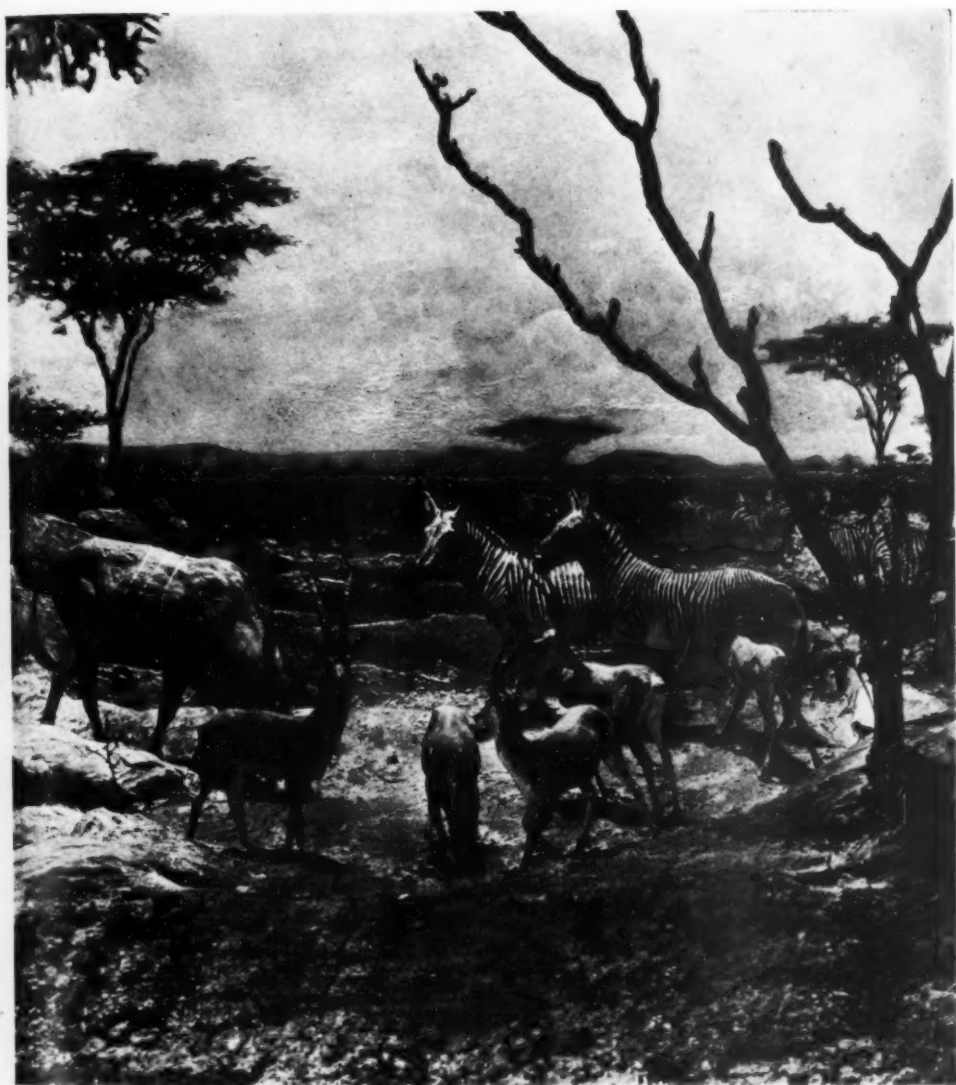
PANORAMIC VIEW OF THE MODEL

Prepared by Louis Jonas under the direction of James L. Clark, assistant director. Foreground and background from color studies by A. A. Jansson

killing. It is told of Mr. Eastman that after watching a beautiful group of giraffes, he declared that he admired them so much he could not possibly shoot one. So was Akeley moved to compassion in the case of the klip-springer.

About this time I located a family of klip-springer on a rock pedestal thirty feet high

and about twenty feet in diameter. Mr. Akeley built a blind and from it we secured excellent still photographs and motion pictures, the only ones, so far as he knew, that had ever been made of these dainty little antelope. As we walked around the base of this sheer rock pedestal, we could not imagine how these little, sure-footed animals could leap to the top. There was apparently no foothold whatsoever. Although our camp was near by and there was considerable noise



FOR THE WATER HOLE GROUP

The animals, which are shown gathered about the water holes, include Grant's gazelle, Grant's zebra, Grevy's zebra, eland, giraffe, and oryx.

from our black boys, as they shouted to each other, or from our cook, as he summoned us to meals with the beating of the frying pan, yet they were apparently wholly unconcerned in their secure fortress. The two klipspringer were apparently mother and son. Although a female was greatly needed for the group, Mr. Akeley was unwilling to take this little mother who had delighted us with her graceful poses. We left the little family unmolested.

Of the disappearance of the most graceful of all antelopes, the impalla (*Aepyceros melampus*), it is recorded:

A few rods below the family of klipspringer, a herd of impalla grazed peacefully or leaped over rocks and small trees in sheer ecstasy of living. On the outskirts of the herd were a few straggling kongoni, *Alcelaphus cokii kongoni*. Fifteen years before when Carl Akeley had camped here and when Theodore



A PANORAMIC VIEW OF THE

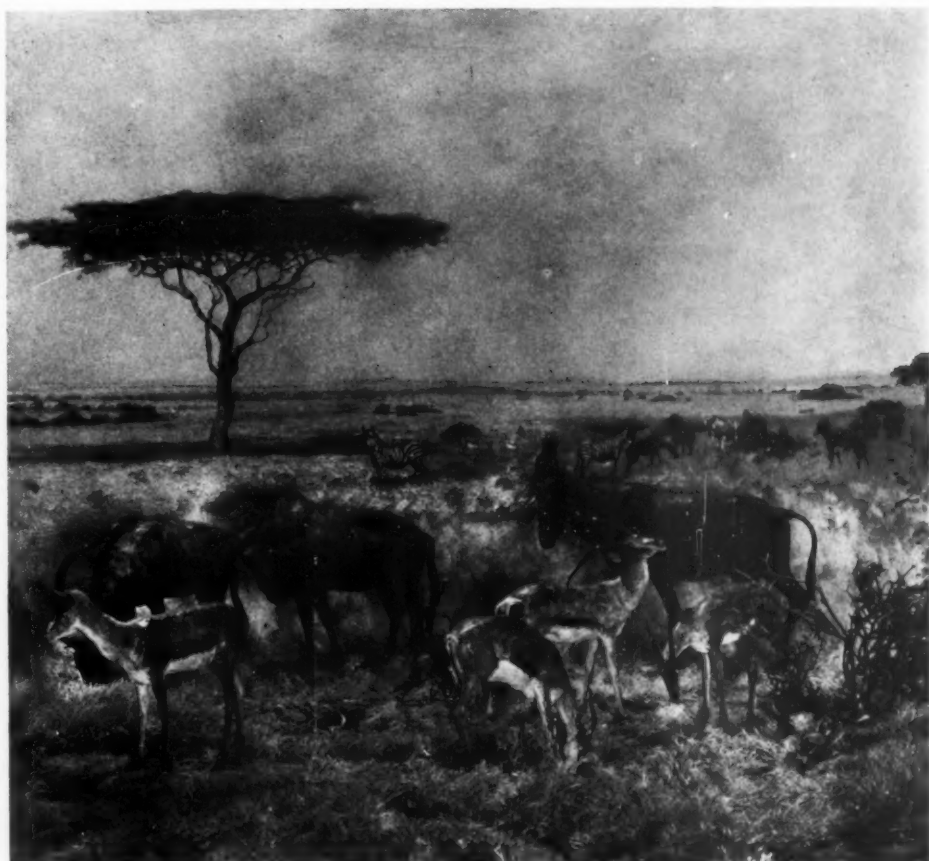
Prepared by Robert H. Rockwell under the direction of James L. Clark, assistant director.
 Foreground and background from color studies by W. R. Leigh

Roosevelt had hunted in this same locality, there were hundreds and thousands of antelope, but with the incoming of the settler and the increasingly great desire on the part of the white man to slaughter, the herds have vanished. In the whole region, we saw no more than half a dozen wildebeeste, and even in the Game Reserve south of the Kenya and Uganda Railway, the herds of game are small as compared to what they were fifteen years ago.

The difficulty experienced by the Eastman-Pomeroy-Akeley East African Expedition in securing the material for the Buffalo Group (*Syncerus caffer*), adds a new chapter to the history of extinction.

We hunted for several days, but the herd, having been shot into, had gone back into the swamp and was unwilling to appear. This country between the Theba and the Tana rivers, once alive with buffalo, now tells the same story of game extermination so apparent in other parts of Africa. The herd, numbering perhaps fifty or sixty, rarely comes out of the swamp except late in the night. They return to the swamp at dawn. An occasional native now came into camp to report that a large buffalo had been seen at a distance from the swamp, but on following up the clue we found the reports without foundation. It proved a tedious and disheartening hunt.

Mr. Leigh found conditions for painting very poor. The day after we arrived, Kenya, the dominant feature of the Buffalo Group background, became enshrouded in a cloud



MODEL FOR THE PLAINS GROUP

Included in this group of animals of the plains are Thomson's gazelle, Robert's gazelle, kongoni, Grant's zebra, white-bearded gnu, topi, and dik dik

mass. While waiting for Kenya's pinnacle to clear, he worked at the foreground of swamp and at the middle background of Kenya's foot hills from which rose the smokes of a hundred Kikuyu fires. Rain, mist, haze and murky atmosphere were some of the trials of our daily life. In camp on the edge of the swamp, the mosquitoes were bad past belief or the previous experience of any of us.

We overtook Mr. Eastman at Embu, where his party had hunted without success, and then we all moved on to Kagio and the Theba River. Messrs. Eastman and Pomeroy made their camp near by. The hunt was short. Mr. Eastman obtained a good cow buffalo for the group. Here the animals are so wild and the country is so impossibly rough for motor transport that specimens are difficult to obtain.

During a two-day trip down the

Tana River, which in 1912 was swarming with game, Akeley found it a complete waste. Returning without success because he had secured no specimens whatever, the full realization of the fast vanishing wild life of Africa came over him and he wrote to Director Sherwood,

I have not appreciated the absolute necessity of carrying on the African Hall, if it is ever to be done, as I now do after this painful revelation. *The old conditions, the story of which we want to tell, are now gone and in another decade the men who knew them will all be gone.*

The above citations, chiefly from the Report of the Eastman-Pomeroy-

YEAR	COLLECTOR	LOCALITY	POPULAR NAME	SCIENTIFIC NAME	SPECIMENS
1909	Carl E. Akeley	Kenya Colony	African Elephant	<i>Loxodonta africana peeli</i>	Two males, cow, calf
1911	Theodore Roosevelt	Belgian Congo	White Rhinoceros	<i>Ceratotherium cottoni</i>	Male, cow, calf
1921	Lang-Chapin	Belgian Congo	Gorilla	<i>Gorilla beringei milensis</i>	Two males, two females, young
1926	Eastman-Pomeroy-Akeley East	Tanganyika Territory	Lesser Koodoo	<i>Strepsiceros inherbis australis</i>	Three males, two females, young
1926	African Expedition	Tanganyika Territory	Greater Koodoo	<i>Strepsiceros strepsiceros bea</i>	Two males, two females, young
1925	Arthur S. Vernay	Portuguese West Africa	Sable Antelope	<i>Egocerus niger variata</i>	Two males, two females, young
1926	Eastman-Pomeroy-Akeley East	Kenya Colony	Klipspringer Group	<i>Oreotragus oreotragus schillingi</i>	Four Klipspringer Six Reedbuck (<i>Redunca fulvorufula chanleri</i>) Five Baboons (<i>Papio furax</i>) Five Hyrax (<i>Heterohyrax brucei borana</i>) Two males, two females, three young
1926	Eastman-Pomeroy-Akeley East	East African specimens for Museum collections	Lion	<i>Felis leo massaica</i>	Nine specimens
1926	African Expedition	Tanganyika Territory	Wild Dog	<i>Lycan pictus lupinus</i>	
1926	African Expedition	"	Plains Group		One Zebra (<i>Equus quagga granti</i>) Six Gnu (<i>Connochates albojubatus</i>) Two Hartbeests (<i>Alcelaphus cokii</i>) Three Robert's Gazelle (<i>Gazella granti robertsi</i>) Four Thomson Gazelle (<i>Gazella thomsonii</i>) Two Topi (<i>Damaliscus jimela</i>) One Dik dik (<i>Rhynchotragus kirkii</i>) Three Giraffe (<i>Giraffe camelopardalis reticulata</i>) Four Greys' zebra (<i>Equus grevyi</i>) Three Oryx (<i>Oryx beisa annexans</i>) Three Grant's Gazelle (<i>Gazelle granti</i>) Two males, female, young
1926	Eastman-Pomeroy-Akeley East	Kenya Colony	Water Hole Group		
1926	African Expedition	"	Buffalo Group	<i>Synceus caffer radcliffi</i>	

Akeley East African Expedition, supplemented by personal letters and records of individual members of the Expedition, reveal what an Herculean effort Akeley was making in this final achievement of his life. Akeley, like Moses, passed away when the promised land was within his sight, and the sadness of his final hours was doubtless alleviated by the certainty that surrounding him were those who would surely carry out his great purpose. In those dramatic and tragic days it fell upon other members of the Expedition, and especially on Mr. Daniel E. Pomeroy and Mrs. Akeley, to help overcome one difficulty after another and carry the Eastman-Pomeroy-Akeley East African Expedition through to its triumphant close.

Of the thirty-six groups destined to fill the main floor and the gallery of the Akeley African Hall, nine were donated and financed between the years 1909 to 1927, through the energy and generosity of the men who led the various expeditions concerned in the assemblage of these nine groups.

THE NATURALIST AND THE ARTIST IN AFRICA

The wonderful moving and still pictures of African wild life by Martin Johnson are also absolutely essential to the realistic design and completion of the African Hall. The only artist who has even approached the work of Martin Johnson in the past is John Guille Millais to whose wonderful volume, *A Breath from the Veldt*, I have already referred. Through marvelous powers of observation and of rapid note taking, he depicted the unbelievable attitudes of the springbuck and of the koodoo, of the impalla, of the reedbuck, and of the sable antelope. Little did he imagine during his tour of South Africa that in the brief space of

thirty years his volume would become one of the priceless records of the past animal glory of that region. Fortunately for us, he avoided the ways of the sportsman and of the naturalist and chose the even more truthful way of the artist, as expressed in the following lines of his preface:

Let me say then at once that though they are occupied in the main with dissertations on, and adventures in pursuit of big game, I have endeavoured as far as possible to avoid trespassing on the domain of the standard authorities on this subject. My object has been rather to supplement from personal observation what is already known of such animals as I came across during a recent tour in South Africa; to present to the best of my ability a true picture of life in that country, whether of man, beast, or bird; and to give to the sportsman of the period what help I can as a guide to the hunting grounds, and how to work them to advantage.

Of the earlier and more old-fashioned works, we have Andrew Smith's *Illustrations of the Zoology of South Africa*, which carries us way back to his expedition into the interior of South Africa in the years 1834, 1835, and 1836, sixty years prior to the artistic journey of Millais. At that time the now extinct quagga was still living, but the artist accompanying Smith's expedition did not figure it. In the Vernay-Angola Expedition, especially outfitted by Mr. Vernay for the sable antelope, this formerly abundant animal was found to be excessively rare, and only by the greatest good fortune at the last moment did Mr. Vernay come across a splendid sable antelope bull for the group which he is presenting to the African Hall.

Whereas South Africa was early opened to the explorer, the agriculturist, the sportsman, and the naturalist through the healthful entrance by the Cape of Good Hope, the last great Central African refuge of the mam-

malian life of the world was protected by the deadly climate of the African coasts and tropical interior and by the impenetrable deserts of the north. It is fortunate that the artistic side of this wondrous life region has been preserved through the new art of photography and through the early achievements of C. G. Schillings in flashlight photography, of Dugmore and Clark in instantaneous photography, succeeded by the photographic work of the expeditions of Paul Rainey, of James Barnes, of Theodore Roosevelt, and crowned by the five years' work of Martin Johnson.

These and other priceless photographic records gave all except color to the African picture. That color is no less important than form in conveying the beauty and grandeur of African life. From the first, Akeley planned for the services of colorists,

and when the final moment came and his ideal was financed, he was fortunate in securing two extremely talented painters, W. R. Leigh and A. A. Jansson, who have brought back the color scheme of all those parts of Africa from which the great animal groups are chiefly drafted. Thus through the union of generosity and artistic genius, the African Hall becomes the Valhalla of the vanishing wild life of the Ethiopian region.

Would that Theodore Roosevelt, ardent friend of Akeley and author of *African Game Trails*, published in the year 1910, and co-author of *Life Histories of African Game Animals*, published in 1914, could have lived to see the Roosevelt Memorial Hall and have passed through its portals into the Akeley African Hall, there to meet Carl Akeley and witness his joy in the realization of the great dream of his life.

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Carl Akeley often described this as the most beautiful spot in all the world, and chose it as the background for the Gorilla Group. The volcanoes Chaninagongo and Namlagira smoulder in the distance. Photograph by Mary L. Jobe Akeley

In the Land of His Dreams

THE LAST CHAPTER OF CARL AKELEY'S 1926 AFRICAN EXPEDITION

BY MARY L. JOBE AKELEY

AFTER months of strenuous preparation and planning Carl Akeley and I sailed for Africa in January, 1926, to begin the work of the Eastman-Pomeroy-Akeley East African Expedition.

A fund to finance the collection and construction of six important groups for the African Hall of the American Museum of Natural History, of which Mr. Akeley had so long dreamed, had been contributed by Messrs. George Eastman, Daniel E. Pomeroy, and the late Colonel Daniel B. Wentz. Happy in the realization that these groups would actually begin his great work, and keenly appreciative of the generosity which had made the undertaking financially possible, Mr. Akeley planned in a single trip to Africa to

secure specimens, scientific data, accessory materials, and background studies for all six of these exhibits. For the first time he was to be accompanied into the field by a staff of two artists, Messrs. William R. Leigh and A. A. Jansson. In addition, two Museum preparators, Messrs. R. H. Rockwell and R. C. Raddatz, were to join him in Africa, but even with their assistance the task he had set for himself was colossal.

Mr. Akeley considered the Kivu volcanoes of the Belgian Congo the most beautiful of all Africa's wonder spots. It was here in 1921 that he had secured gorillas to be mounted in one of the four corner groups for African Hall. At that time his enjoyment of the scenic splendor of these volcanoes

was marred only by his regret that no artist accompanied him to paint a background for his group and he keenly anticipated his return. Meanwhile, the creation by Belgian Royal Decree of the Parc National Albert, with the Gorilla Sanctuary at its heart, to preserve for all time the flora and fauna of this region afforded him intense satisfaction.

Mr. Akeley's old friend, M. Edmond Lepplae, Director General of Agriculture in the Belgian Ministry of Colonies, was deeply interested in Mr. Akeley's work in the Gorilla Sanctuary in the Belgian Congo and, as we were passing through Brussels, requested him to be prepared for an audience with King Albert. The next day we were summoned to the Palace and presented to the King and to Prince Leopold. Both were highly appreciative of my husband's plans for conservation of the gorilla, inquired concerning our forthcoming expedition, and expressed the desire to know the results of our work on our return. Subsequently, the Belgian Government formally commissioned Mr. Akeley to make a general survey of the Parc National Albert, to continue the study of the flora and fauna, especially of the gorilla, and to suggest proper locations and means for the erection of laboratories in a central station of the Parc. His intense interest in the fulfillment of this mission, as well as his eagerness to provide the correct setting for one of the four major groups of African Hall, made him regard the work in the Belgian Congo as necessary to the completion of the African Hall expedition.

Autumn of 1926 saw the conclusion of the major part of the expedition's program. In the Lukenia Hills, the historic home of the tiny rock-dwelling klipspringer, studies had been made for

the background and plant accessories, and part of the specimens had been taken for the Klipspringer Group. As this region is no longer a game country, it was necessary to complete the group with specimens taken by Mr. Rockwell on a hunt in the Kedong. During four strenuous weeks on the Northern Uaso Nyiro in the Northern Frontier of Kenya Colony, Mr. Akeley and Mr. Rockwell had collected the bull, cow, and young giraffe, as well as zebra, oryx, and various small antelopes for the Water Hole Group, while the painters had reproduced for its background a scene which the pioneers of the country frequently refer to as "The Gateway of the Northern Frontier,"—a fine prospect of plain and mountain range. At the Tinga-Tinga, near Kagio, between the Theba and the Tana, we had joined Mr. Eastman and Mr. Pomeroy in a short but arduous hunt for buffalo. While the artists and Mr. Rockwell remained there to finish landscape studies and the collection of specimens, we joined Messrs. Eastman, Pomeroy, and Johnson in Western Tanganyika where remarkable motion-picture records of lions were made. During the interims of photography, Mr. Akeley seized the opportunity to collect specimens for an additional exhibit, the Plains Group, and furthermore, by a stroke of good fortune, collected an entire band of nine wild dogs, thus unexpectedly securing specimens for a group long desired. Backgrounds for these groups were also painted. Altogether, the expedition returned with materials for ten groups instead of the six originally planned. The story of these first seven and a half months of Carl Akeley's last expedition in Africa is to be told in a series of articles in *The World's Work*.

In the midst of his collecting in

Western Tanganyika and following the extreme exertion of these months in the field, Mr. Akeley had an attack of fever. It was a great disappointment to him that because of this illness he was prevented from accompanying Mr. Pomeroy to Eastern Tanganyika to obtain greater koodoo specimens, a trip long planned and keenly anticipated. His last words to Mr. Pomeroy at Nairobi were, "Well, Dan, you will never know how sorry I am not to go on the koodoo hunt with you." After two weeks in the Kenya Nursing Home in Nairobi, where the physician pronounced his case one of complete exhaustion, and not of tropical disease, he was able to come to our base house in Nairobi, where he spent the next fortnight recuperating somewhat, but for the most part preparing for the trip to the Congo which he was so eager to begin.

In Brussels Mr. Akeley had suggested to the American Ambassador, Mr. William Phillips, that it would be of value to scientific investigation both

in Belgium and in America if Dr. J. M. Derscheid of the Congo Museum at Tervueren, who was then at work upon a topographical map of the Kivu, should join us for our expedition to the Parc National Albert. The Ambassador cordially endorsed this plan and ultimately brought about its consummation with the King of the Belgians. Doctor Derscheid joined us in Nairobi late in September.

On October 14, 1926, we started for the Belgian Congo with three motor lorries and one small car. In addition to Doctor Derscheid, our party included Messrs. Leigh and Raddatz, and Mr. Akeley's faithful Kikuyu gun-boy, Bill. A week later at Kampala it was necessary to do the usual overhauling of cars, secure information about the roads of Western Uganda, and the possibility of obtaining porters at Kabale, at the end of the motor road. West of Kampala we found some badly washed roads and broken bridges which had to be repaired. Although Mr. Akeley had by no means



The gorilla nest which was brought to New York as one of the accessories for the Gorilla Group. Photograph by Mary L. Jobe Akeley

recovered his strength, he worked with his usual old-time vigor on all this heavy labor. One of the worst jobs was getting up the hill east of Kabale. This ascent was accomplished by having several score of natives push us and by attaching a cable to each lorry and using the small car to pull each in turn.

At Kabale, the District Commissioner, Captain Tufnell, and the Assistant District Commissioner, Mr. Vaughan Jenkins, welcomed us cordially and gave us every assistance in their power to bestow.

On Thursday, October 28, we were packed and ready for our two hundred porters, whom we found prompt, quick, and strong. We moved our outfit from Kabale across Lake Bunyoni to Bufundi. Four long days on foot over the mountains of Western Uganda followed. On Monday, November 1, we reached the Congo border where the splendidly kept roads of Uganda, all of which are traveled and frequently tree-shaded, gave place to muddy, overgrown trails.

Our marches, accomplished without bicycle or chair, had averaged about fifteen miles a day and we were all extremely tired. On November 1 there were many hills to climb, the heat and humidity were almost unbearable, and Mr. Akeley became faint and ill and too weak to walk. He was carried in an improvised hammock about four miles. In a thunder storm, Bill and I, with two or three boys, made him a little camp three miles east of Rutshuru. The remainder of the safari with Messrs. Leigh and Raddatz had outdistanced us and had gone into Rutshuru. Fortunately, Bill was able to recover one tent and sufficient food for the night from the rear ranks of the porters. The next day Mr. Akeley

felt better and walked into Rutshuru.

Inability to secure porters delayed us there until Saturday, November 6. The Catholic church was being dedicated and all the natives were celebrating. These were strenuous days for Mr. Akeley in Rutshuru. He had trouble to get Congo currency. He had to obtain permits for entrance into the Congo, pay taxes on all our possessions including our guns, and go through the usual long and detailed formalities. At the time of the dedication of the Rutshuru church, he spent one entire morning in photographing the church ceremonies and afterward in photographing the native dances of the Batwa, the semi-pygmyes of the Congo.

The Congo porters are not big and upstanding like the natives of Uganda. Many were lame and in bad physical condition. As they can carry only thirty or forty pounds we had to repack all our loads for them—a big task in itself. The second day after leaving Rutshuru, we reached the White Friars' Mission at Lulenga. Here Mr. Akeley and Raddatz spent three strenuous hours repairing the Fathers' motor cycle. We departed in a cold, heavy drizzle, which continued until we reached camp at Burunga at twilight. It was here that Mr. Akeley in 1921 had secured his gorilla guide and porters to take him up into the volcanoes, but the old Chief Burunga, who aided him at that time, had since been banished from the section, because of the commission of petty crimes. However, several of Mr. Akeley's former native boys came into our service, and later on his old gorilla guide, M'Guru, hearing that Mr. Akeley had returned to the country, joined us in our camp at Rueru, at the upper edge of the bamboos at an altitude of 9500 feet.

On our way up to the Rueru camp

we encountered cold and persistent rain. We often waded in mud above our boot-tops. The trail was so steep and slippery that progress was indeed difficult. November 9 was cold and wet, as were almost all of the succeeding days while we were in the Kivu. It rained so hard on the ninth, tenth, and eleventh that it was inadvisable to move out of the Rueru camp. Our guides, however, used the time to cut a trail through the dense undergrowth up to Mr. Akeley's old camp on the saddle between Mikeno and Karisimbi. On Friday, November 12, Raddatz, in charge of the porters, moved the main part of our provisions to the high camp and Doctor Derscheid followed on November 13. That Friday Mr. Akeley felt very weak and on the thirteenth spent the day quietly in bed, reading and sleeping. On the fourteenth he felt better and we moved the remainder of the camp up to the saddle. He walked from our camp across the cañon and up the first steep grade; he was then carried part of the way, but, as he said he felt very cold, he walked the last three miles into camp. A cold rain fell during the whole trip.

When we reached the camp, he was very much exhausted; nevertheless he related to Doctor Derscheid and me several of his experiences with gorillas in 1921. The atmospheric temperature stood slightly above freezing; there was a heavy mist and the wind blew violently down from the mountain top. We pitched our camp and got our little charcoal stoves going. He was unable to leave the tent thereafter.

It will be evident to even the casual reader of this article, as well as to our friends who knew what this expedition meant to my husband and to me, that

it is well nigh impossible for me to chronicle the remaining events of the Congo expedition; to tell of the two and a half days of exhaustion which my husband suffered, following our arrival at the Mikeno camp, and of the sudden end on November 17; of how we laid his mortal body away in a tomb of solid volcanic rock in the midst of the country he loved, the "most beautiful spot in all the world"; of how we both had felt, on the entire expedition, that life for us was only at the beginning; and of how to me, life now seemed to have come to an abrupt ending; of how, ultimately, I found strength to go on alone, to complete to the best of my ability his unfinished work; and of how, in all the succeeding months of work, his spirit urged me on beyond any doubt or denial.

I can only add here an extract from a letter which I wrote on November 24, 1926, from our Mikeno camp to our close friends, Mr. D. E. Pomeroy and Mr. George H. Sherwood:

He seemed always eager to push on to his goal—the *Gorilla Sanctuary*—remarking at almost each camp, "This is a beautiful spot and one I would like to spend a day in, were it not that every day in the Kivu is so precious, and there the beauties of forest and mountain surpass all this ten-fold. I sometimes felt he was torn between the physical desire to rest and the great urge of reaching the Kivu goal. None of us had a chair and he often remarked that he had never yet been carried on safari, as seems to be customary.

The day we came up to this camp, he enjoyed every bit of the forest and as I walked beside him, he would say, 'Mary, this is the Kivu at last. Here the fairies play!' or, 'Isn't this forest the most beautiful, the most ancient in all the world?'

Raddatz helped me wonderfully at the end—as he has on the whole trip. We were able to make a vault eight feet deep, in the lava gravel and rock. We made him a coffin of solid, native mahogany, metal lined. We lined the vault with closely set wooden beams, and tomorrow we are making a roof of thick

mahogany planks over it all, to shed the water. The plot itself is high, with natural drainage on every side. The tomb will finally be covered by a pyramid of lava rock and we hope to find a slab on which we can engrave his name. (Raddatz subsequently covered the grave with a slab of cement ten by twelve feet and five inches in thickness. We obtained the cement from Captain Tufnell in Kabale, but it was necessary to send our porters a second time, as nearly all of the first supply was spilled or more probably thrown away en route by the natives who carried it. Later my porters brought from Captain Tufnell in Kabale sixteen loads of Bermuda grass to be planted on the outside of the stockade to prevent the encroachments of the jungle. The cement slab bears the name CARL AKELEY, and the date, NOVEMBER 17, 1926). The whole plot will be surrounded by a close stockade of eight-inch trees, and over this we shall plant a vine which grows quickly and is as strong almost as steel. This will be a strong fortress against the herds of buffalo and elephant which are numerous here. Doctor Derscheid, Raddatz, and I have worked every hour of daylight to give him the best home we

could build, and he was buried as I think he would have liked with a simple reading service and a prayer.

He often said he wished to "die in the harness," and "to be buried in Africa." Whether he had any awareness of the end before the hemorrhages came, I cannot tell. To me he seemed far less ill than in Tanganyika, but he was always weaker and often expressed the wish "just to sleep." He often said he "was doing more in the nine months

of this expedition than he had previously done on a two years' expedition.

All of the work of the Congo expedition was now before us. There seemed to be only one solution, to remain and

complete the work so far as we all were able. We located the scene from which Mr. Akeley had wished the gorilla background painted, the photograph of which he had often shown me, and which he considered the most impressively beautiful scene in all Africa. On the morning of the twenty-first Mr. Leigh's camp was moved there and he began his work. During the succeeding days, Doctor Derscheid accompanied by Bill and twenty porters, guides, and askaris, made a ten-day survey trip around Mikenno. With Bill's help he succeeded in getting within two hundred feet of the top of Mikenno, a hitherto unaccomplished feat and one fraught with



A giant parasite collected by R. C. Raddatz as an accessory for the Gorilla Group. Photograph by Mary L. Jobe Akeley

danger owing to the steepness of the slippery, moss-grown rocks. Later he climbed Karissimbi in heavy storm, reaching the summit alone.

Thereafter the weather continued cold; the clouds enveloped us; frequently light rains fell. My fifty porters were practically naked and their provisions so short that it was

with great difficulty I kept them on the job. My cook, who knew a little of the Congo language, stood by me and was of the greatest assistance in Bill's absence. Each day the black boys had to cut a large supply of wood for our fires and for their own fires in their little huts, which they constructed of sticks and the green undergrowth. The water supply in the near-by swamp proved insufficient, just as it had in 1921 when Mr. Akeley camped there; consequently, the porters had to carry our water from a pool in the cañon near the Rueru camp. Each day it was necessary for us to send Mr. Leigh's meals and water up to his camp.

The problem of our porters' food was serious. The average Congo porter eats beans, but the headmen, the askaris, and our own East African boys demanded rice. I, therefore, had to have a group of porters almost constantly in transit to and from Kisenyi, the Lulenga Mission or Rutshuru in order to obtain any available food. The small chief at Burunga visited us occasionally and considerably sent a few potatoes, two sheep, and one small ox. The chief at Kigezi finally sent a fair supply of food, but there were times when I felt thoroughly ashamed to ration out such small supplies to our porters as I was compelled to do and to receive in turn their disappointed looks and often their spoken complaints. One day when there was no food whatsoever in camp for them, I gave them sixty pounds of our own white flour. They seemed to appreciate it and to sense that I would not willingly see them go hungry.

All the porters were asking to go back to their homes but I held them by promising them relief in a week or ten days. I then sent an urgent request to the authorities at Rutshuru

and to the chief at Kigezi for more porters. Although relief did not come in the appointed time, the porters stayed with me. In fact, their manifestations of loyalty and readiness to help in my extremity amazed me. Only one deserted. I planned their work so that fifteen worked for a period of two hours while the others remained in their little huts by the fires. Then another shift came on and so on throughout the day.

We kept ourselves warm by wearing our heaviest clothing and by having little charcoal stoves going when we were in our tents. Fortunately, the natives made good charcoal.

During the same time of year while in the Kivu in 1921, Mr. Akeley had had much fair weather even in the midst of the rainy season. In contrast we had very little sunshine during a period of seven weeks, but that little, when we had it, was utilized to the best possible advantage. Mr. Leigh completed his paintings and made color studies of the foreground accessories of vegetation for the Gorilla Group. Doctor Derscheid continued his survey work in or near the camp or on the plains below. Raddatz worked faithfully and effectively. He made more than two hundred plaster casts for the reproduction of the vegetation, drying them with difficulty. Raddatz and I went frequently into the field near Mr. Leigh's camp for the plant accessory specimens. Here also I obtained a complete set of photographs of these accessories and of the forest and mountain landscape.

In addition to the plaster casts, Raddatz prepared formalin specimens of twenty-three plants. Bill made a collection of birds and I obtained a gorilla nest and a large quantity of moss and bark for the gorilla foreground.

We removed the upper part of the old tree, at the base of which the big gorilla fell in 1921, and collected sections of other small trees, to be used as accessories for the Gorilla Group.

In the bamboos below our camp we saw many signs of elephant, while buffalo came into our swamp to drink. Leopards were numerous. Frequently at night I heard one walking around my tent. His tracks were visible within two or three feet of my doorway each morning. We planned to set a trap for him, but it seemed that we were all too busy or too tired at night to do it.

We found many gorilla nests and fresh tracks of gorillas within two miles of our camp. Once, Doctor Derscheid and Bill were in the midst of a large band within good photographic range. They reported them as gentle and only mildly curious even when followed for more than an hour. Subsequently, Doctor Derscheid surprised at very close range a large band. One old male resented the intrusion, charged, and it was necessary for Derscheid to stop him with his gun. The gorilla, although barely scratched on the shoulder, turned aside quickly and the whole band disappeared.

When our porters arrived a day late, they proved insufficient to carry our collection and our outfit out of the Kivu, and we had to move it in relays, down the mountain-side. Finally, when we reached Rutshuru, I persuaded the local king to give me a few more porters to send back for the extra loads.

At this lower altitude the heat was intense, in great contrast to the cold rains of Mikeno.

It remained for us to transport our outfit to Lake Hannington in the Great Rift Valley, Kenya, to obtain the background and accessory studies for the greater koodoo group. The story of

this part of the expedition will be told in a later issue of this magazine. It was the sixth of February, 1927, when we returned to Nairobi to conclude expedition affairs and prepare for our homeward journey.

In April when Mr. Akeley and I had been at Government House, he had promised the Governor, His Excellency, Sir Edward Grigg, that he would exhibit all the paintings of the expedition before our departure for America. Accordingly, on February 18, 1927, at the Legislative Hall in Nairobi, the exhibition was held under the auspices of the Kenya Arts and Crafts Society. As the Governor was on leave in England, it was formally opened by the acting governor, Sir Edward D. Denham, who in his speech paid high tribute to Mr. Akeley's genius and devotion to his work. Judging by the attendance and appreciation of the press, the exhibition was a revelation to the residents of Kenya of the beauties of Africa, and was well worth the effort involved. Many requests for photographic copies of these paintings have since come to me.

En route to America, I again visited Brussels at the request of His Majesty, Albert, King of the Belgians. Here, in accordance with Mr. Akeley's wish, I presented to His Majesty, on the occasion of his birthday, one of Mr. Leigh's paintings of the Parc National Albert, and at his request gave him a verbal report of the expedition in the Belgian Congo.

At a General Assembly of the Société pour la protection de Nature held at Brussels, on July 9, 1927, Mr. Akeley was unanimously elected, posthumously, Membre d'Honneur of the Society "as a mark of appreciation of his eminent and distinguished services to science and to the work of conservation."



The personnel of the Eastman-Pomeroy-Akeley East African Expedition

A Safari in Africa

By GEORGE EASTMAN

IN COLLABORATION WITH DR. AUDLEY D. STEWART

FOR a week after our arrival in Africa the rains held us in Nairobi, making the trip over the four hundred odd miles of trail to Lake Paradise almost an impossibility. The roads for twenty-five miles around Nairobi were next to impassable, and Martin Johnson's headquarters, almost half a thousand miles away, seemed very far indeed. Yet we were most desirous of getting into the field, and when Philip Percival, our white hunter, suggested that we go down to the Rift Valley, sixty miles or so from Nairobi, we seized upon his suggestion with delight and made ready to depart. Being in Africa, we were keen to be in the field. Nairobi was interesting, certainly, but despite the comfortable cottage that Carl Akeley had rented

and which served as our permanent headquarters, despite the generous efforts of innumerable people to make our stay in the little city entertaining, we felt balked by the rains, and were doubly anxious to get away. The Rift Valley trip would give us an opportunity to test out our camp outfit for a week or two, and would make it possible for us to start our "bags" with a few specimens of the common plains animals.

Percival and Martin Johnson went out on a scouting trip and reported when they returned that game was plentiful, so we were keener than ever to be on our way. But a wire came from Percival when he started out ahead of us with a motor truck, telling us to put our automobiles on a flat car and fol-

low him that way as far as we could. Thus it was that our departure from Nairobi was less romantic than we might have hoped, for we started on our way riding on boxes in the "brake van" of a freight train. It was only for twenty-five miles or so, however, that we traveled in this fashion, and at the station of Limuru we detrained, unloaded our automobiles, ate our lunch, and started over the hills toward Bailey Camp in the Kedong—a part of the beautiful Rift Valley.

There were thirty-seven—whites and natives—in our party. Phil Percival, as capable and experienced a hunter as one could hope to find, and Mr. and Mrs. Martin Johnson were really responsible for the success of the venture. Daniel E. Pomeroy, Audley Stewart, and I, together with a Boer chauffeur, made up the rest of the white contingent, while gun-bearers, tent boys, porters, syces, a cook, and a headman who had lost an eye in a rough-and-tumble fight with a leopard while he was with Stewart Edward White a year or two ago, added that dash of local color—and smell—that served to keep constantly before us the fact that we were in the game lands of Akeley's *Brightest Africa*.

It was toward Bailey Camp, in the Kedong Valley, that we headed, and having reached it we found not only that a comfortable camp was set up and ready for our occupancy, but also that we were, in reality, in the very home of big game. Only two weeks before our arrival a rhino, just a little way from that very camp, had charged and seriously injured Mrs. Bailey, who had been camped there with her husband, and as we began our hunt we knew that she lay between life and death at the Nairobi hospital. That she later recovered and resumed her hunting with

her husband was most fortunate, but when we arrived at the spot from which she had been carried only a few days earlier, we had no assurance of so gratifying an outcome of the affair. Furthermore, the head of the particular rhino that had been responsible was still in camp when we appeared, and bore the gruesome traces of the encounter on his once dangerous horn.

The site of the camp was delightful. I was reminded more than once of my own camp in Peaceful Valley, Wyoming, save for the fact that the mountains were not so high and the valley was much larger. Back of the camp to the south the ground rose to an old volcanic crater, and about us was a beautiful grove of spreading mimosa trees, some of the trunks fully two feet in diameter. To the north the valley lay, three or four miles across, stretching east and west far beyond our range of vision. The floor of the valley was level, and was quite smooth enough to make it possible for us to run our cars almost anywhere.

We were on the edge of the Masai country—a reserve so far as white settlements are concerned, but not a game reserve—and we were on the road to Tanganyika Territory, a land we planned to visit.

The valley was filled with game. There were kongoni, zebra, Grant's gazelle, "tommies" (Thompson's gazelle), ostrich, giraffe, steinbuck, dik dik, eland, wart hog, and others. There was a herd of about a hundred and fifty kongoni immediately in front of camp when we arrived, and of course hyenas were about, while jackals, too, made their timid way across the valley. Merely to sit in camp and gaze out across that magnificent valley, dotted as it was with game, was thrilling, but hardly more than four or five days had

passed when I experienced a thrill that far surpassed any other it has been my pleasure to experience.

Stewart, Percival, and I started out early one morning to see whether or not we could locate a Grant's gazelle that had fallen off the back of the car as it was being brought to camp the evening before. We searched unsuccessfully for an hour or so, and then gave it up in order to start across the veldt to see what we could see. We had not gone far, winding in and out among the scattered thorn trees, when Percival, with far less excitement apparent in his voice than I suspect would have been in mine, pointed and said simply, "Look at the lions."

About three hundred yards on our left were a lioness, two cubs, and a male. They had just left a zebra kill and were making their way toward some bush to lie up for the day. We approached to within 125 yards of the lions when the male stopped. There is no doubt of the majesty of a lion in the open. I felt it there, even at that distance, but we had come for lions, and I gave him a soft-nose Mannlicher bullet in the groin. He started to run, but changed his mind and faced us once more. Obviously he was making up his mind what to do, so we advanced, slowly, and at about one-hundred yards I gave him another bullet—this time in the chest. He collapsed where he stood, and leaving one of the gun-bearers to guard him, we started after the lioness, but she had disappeared with the cubs.

We found, when we returned to the lion, that he was a big one (8 feet 8 inches) in the prime of life and in perfect condition, except that his skin was much scarred. We had some difficulty, because of his weight, in getting him back to camp, and there the natives

insisted on gathering around and shaking hands. In the evening they gave a dance in celebration, and as part of the affair, Stewart and I were carried about on their shoulders. All this might have been more flattering had it not been for the fact that custom has made it necessary for the successful lion hunter to give *bakshish* to the natives of his safari at such a celebration, and one did not need be so very suspicious to get the impression that the desire for gain at least as much as the joy experienced upon the death of so powerful an enemy had been the real reason behind this display of native delight.

Only two days after getting our first lion, we returned to Nairobi, in order to make ready for the long trip to Lake Paradise.

The major reasons for the Eastman-Pomeroy-Akeley Expedition, were, of course, the collection of material to go into the preparation of the groups that ultimately will appear in the Akeley African Hall at the American Museum. It is my pleasure and good fortune to be connected with that immensely valuable project, but being inexperienced as a museum collector, my own field work was devoted to the collection of only one group—the buffaloes—while the rest of my time was spent in getting acquainted with the people and the animals of the marvelously beautiful land that the Hall will represent.

It was Carl Akeley who, in the field, had the major responsibilities of planning and superintending the execution of the numerous phases of the work, and as a result, we were often separated from the camp of that indefatigable worker.

When we returned from the Kedong Valley, Akeley was busily engaged in looking after the work his artists and

taxidermists were doing in the field. It was thus that our trip to Paradise Lake, the wilderness home of the Johnson's, was made without Mr. and Mrs. Akeley.

The trip to Lake Paradise was made by motor, and with the exception of one heavy rain during which our trucks mired down in the soft road, it was thoroughly delightful. The lake itself is situated in an old volcanic crater, and above it, on a ridge to the west, are located the houses that the Johnsons have built. The various houses, which are made of wattles, plastered with mud and thatched with straw, except the one in which Stewart and I were quartered, are on various levels following the undulations of the ridge. They consist of a living and dining room with a fireplace and a mud floor, a kitchen, a sleeping house for the Johnsons, a guest house, a bath house, a work shop in which an electric generator is installed, the photographic laboratory, and a storehouse. From these houses the ground slopes away from the lake to the "shamba" or garden, and below that is the native village of huts where the "boys" employed about the place are quartered. The place is almost exclusively a masculine paradise, for aside from Osa Johnson and two native women, the residents are entirely men.

The Johnsons had erected a log house for Stewart and me, while Dan Pomeroy was assigned to the guest house, and the white hunters erected their tents. The rooms are heated by fireplaces, and the hard wood grown in the vicinity burns very much as coal might burn, except that there is little smoke and no soot.

On the way to Paradise Lake we had some very good hunting, during which both Stewart and I got lions. Further-

more, coming across a rhino while we were after something else, I decided to get a motion picture of him with a Ciné-Kodak. With Phil Percival and Martin Johnson as my guard, I approached to within about twenty yards of him before he saw us, but he had no sooner made us out than he charged. I started my camera, while Phil and Martin stood by. They let him get to within ten yards, and then Phil fired. Martin followed his example, while I was still busy with the camera. The old fellow kept coming, but he began to crumple, and finally fell just five and a half paces from where I stood. The affair could not have been more perfect if it had been staged, and I felt that it was the opportunity of a lifetime. The picture, too, came out well, and I consider it one of the outstanding "trophy" of my trip.

On another occasion, while we were camped at the "Wells" on the way north, a lion entered camp at night, and tried to take one of our mules. It all happened directly between our tents and where the "boys" were sleeping, which may explain why the mule got away. The lion got both claws into the mule's jaws—from behind—but for some reason did not hang on. It may be that he began to realize about then what a large camp he had gotten into. The mule was cut up a bit but made a good recovery. A leopard visited the camp the next night but did no harm, and Martin Johnson got a flashlight picture of him feeding on a zebra the night following.

A month, almost to the day, from the time we left Nairobi for Lake Paradise, we started on our trip back. We made an unsuccessful side trip after elephants, but though we located some, they were not sufficiently large to

warrant our shooting them. After several days we abandoned the elephant hunt and returned to our base camp, and then went on to the "Wells," where we found the Akeleys with their corps of artists and taxidermists.

eight or ten miles away, where a herd of buffaloes was known to be.

To hunt the creatures in the swamp was impossible, for the papyrus grew there eight or ten feet high, hiding the animals. We were fortunate, however,



Gangway! The most cantankerous of African big game resents intrusion in his territory. From the moving-picture film "Simba"

Leaving them there, we continued toward the Tana River, where we hoped to get rhino and buffalo.

Our first buffalo hunt was unsuccessful because of the thick bush. We spent one afternoon after them, but Percival decided that the work was too difficult under such conditions, so we moved camp, stopping at Akeley's camp on the way. We learned, there, that he had had a painful automobile accident. While he was driving his car through the grass, a front wheel had struck a hidden boulder, and he was thrown so forcibly against the wheel that he tore some cartilages loose from his breastbone. Stewart strapped him up and we continued toward a swamp

in finding a herd of about sixty a mile or so on the farther side of the swamp. Stewart, Percival, and I, with our gun bearers, succeeded in stalking them to within a hundred yards, and I shot first at a big bull, Percival and Stewart following. I could not tell whether I had hit my mark, and though we followed the herd as they departed, we lost them at dusk. In the *melée* a cow charged and was killed, and was immediately very carefully skinned for the Museum group. Trouble might have resulted over her, for my gun jammed after I had hit her with one bullet, and Percival had to come to my assistance by bringing her down.

We spent several more days without

success after the buffalo, and then, due to having broken a spring of our car when it dropped a wheel into a wart-hog hole, we were forced to make our way toward Nairobi.

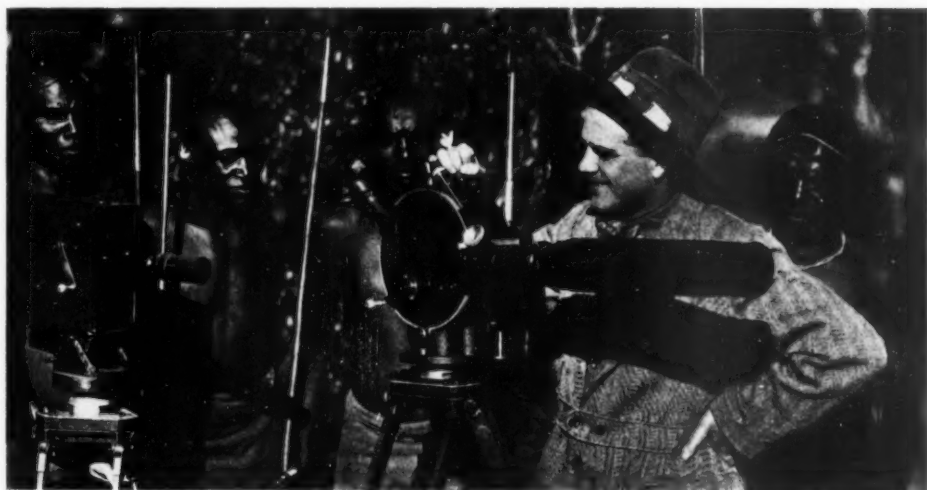
Following our return to Nairobi, we made ready for the trip to Tanganyika Territory, but there is little space here for a detailed account of our experiences on the long trip to the 'Ngourmetti River and return. We were fortunate almost beyond our expectations, for we collected a series of excellent buffaloes on a hunt during which the tall grass seemed almost to boil with the stampeding animals. The prize of the lot was an old bull with a horn spread of forty-two and a half inches. Furthermore, while we were discussing the hunt upon our return to camp, a native boy came running in with word that a lion had mauled a couple of other natives who were building a blind for us. We learned, when we hurried to the blind, that only one boy had been injured, and though his scratches and the one bite the lion had managed to inflict seemed serious to me, the fellow, under Stewart's care, made a wonderful recovery and was about within three days. Shortly after this near-tragedy, I killed the largest lion I obtained on the trip. He measured nine feet four inches, and had a magnificent yellow mane.

It was on this trip, too, that we were fortunate in obtaining a remarkable series of motion pictures of Lumbwa natives spearing lions. After several hunts during which the natives speared a buffalo and had several other experiences in bushes too thick to make it possible for Johnson to photograph them at their dangerous work, they moved a few miles to a section where the bushes were less thick, and there the cameras recorded one of the most

extraordinary stories of native African hunting that it is possible to imagine.

The amazing ability and bravery of these naked warriors when facing a lion in the open is beyond praise. With nothing to protect them save their leather shields—with nothing more effective in the way of weapons than their spears, they do not hesitate to close in on a lion, and despite the apparent barbarity of their method of hunting, it is, in reality, a merciful and exceedingly rapid procedure. With extraordinary accuracy, the spears fly to their marks, and in less time than it takes to tell, the lion has been pinned to the ground.

I have been able to tell of only a few of the happenings of the expedition of which I was a part. Nor have I done justice to Carl Akeley, that extraordinary character whose remains lie forever in the heart of the continent he loved, or of Osa and Martin Johnson whose photographic records of that land are so important an addition to the study of African wild life. Neither have I more than mentioned the others who made up our party, yet this has not been an oversight. Elsewhere I have prepared a somewhat more extended record, but even there I have done scant justice to these delightful and able individuals. The work in which each one of us was interested—the studies that are ultimately to be presented to the public by the Museum in which we all have so great and abiding interest—will be the monument that will stand permanently as a record of the achievements of those with whom I was associated, and little indeed can I add to the reputations of those who have already created for themselves an unrivaled place in the wide field of their own successful labors.



Picturing Africa

By MARTIN JOHNSON

I DOUBT very much whether any one who has not tried it has any conception of the difficulties connected with making wild-animal pictures. The screen pictures of the veldt, showing all kinds of wild game roving about, seemingly unaware of the presence of the camera and the camera man, often delude the audience into thinking that after all it is rather easy to photograph them. Herein art and skill defeat themselves. The better an animal picture is made, the less exciting it appears to be. The easiest thing to do is to shoot an animal with a high-power rifle at a comfortable and safe distance, or to run it down with a motor car, picturing the process and its excitements. The hardest thing is to picture that same animal in a calm, undisturbed state of nature. But that is the most important thing that the camera can attain.

I can well remember our first trip to Africa. It was during the driest part of the dry season. All along the railway line from Mombasa to Nairobi Mrs. Johnson and I saw thousands upon thousands of head of wild game

—wildebeeste, zebra, Tommies, Grants, ostriches, giraffes, wart-hogs, kongoni, and eland. Spellbound we looked out of the window of our compartment. It was the most wonderful sight that we had ever seen, and we could hardly wait to get off the train to start photographing. It looked so easy that we thought we might have our picture done in a few weeks—and have the world's greatest animal picture at that, easily.

Two weeks after we had equipped our safari in Nairobi we were out on the Athia plains in our first camp. Then came disillusion. Game was everywhere, but the stubbornly suspicious animals would not let us get within camera range. For the first three weeks we got nothing but extremely long range scenes, and, when I developed tests, I found that the heat waves that dance in the distances had distorted and practically ruined the pictures. Then we tried building blinds, and we spent endless hours in them waiting for the game to come down to the water holes within camera range. But there were too many

water holes and the whimsical, suspicious animals chose to drink elsewhere. They would not come near our blinds. After five weeks we gave up and went back to Nairobi. It was not going to be so easy as we thought.

Osa and I talked it over and decided on new strategy. We planned to make a long safari of nearly four hundred miles to the arid districts in the north of British East where there were few water holes. There the game would be forced by thirst to come into the range of the cameras.

This safari cost us much time and a great deal of money. When we at last arrived we found a new set of hampering conditions. The nomadic natives with their herds were using the water holes for their stock by day and the game came down to drink at night. We safaried from one water hole to another until at last we came to one that was unmolested by the natives. Again we spent weeks in the blinds which we had to rebuild again and again, the while we learned a bit at a time about how and where they should be made. It was more than four months after we landed in Africa before we had a single scene worth putting on the screen.

The problems encountered in picture-making are many and complex. The camera makes certain demands. There must be fair light. The shadows must fall right, else the picture will be flat and uninteresting. The angles of view must be selected so as to avoid bald skies and awkward compositions. The footing must be stable and steady lest vibrations mar the picture. And that is only the beginning. The blind must be built to windward of the water hole so that the human, or inhuman, scent of the camera man does not reach the animals on some wafting

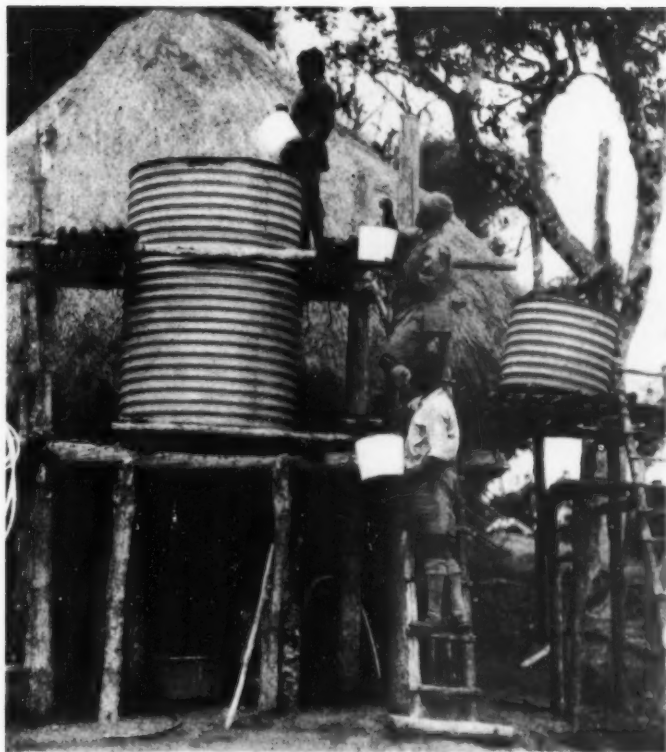
breeze. If possible the blind should be slightly higher than the spot to be pictured, because the scent, carried by the rising heat of the body tends to go upward. Also the blind must be as perfect a bit of camouflage as possible. The animals have a critical eye. They do not admire a conspicuous blind. It offends their taste in landscape and challenges their sense of discretion. They do not enjoy having their Africa tinkered with. They do not like the click of a camera either. They never consciously get confidential with a photographer. African animals have only two lines of action with reference to the camera. They either run from it or at it. Neither treatment is entirely satisfactory to the man behind the camera.

Most of the members of the numerous antelope family and the other grazing animals like the giraffe and zebra can be photographed from blinds. Also now and then one gets a chance at the lions and leopards and other beasts of prey which follow the herbivorous animals to the water holes. But there are animals in Africa which seldom or never drink—the gerenuk for instance. It is but by the merest chance that such animals stray within the range of a water hole blind. They must be stalked afoot by the camera man. It is always a stern chase, which is notoriously a long chase—with usually nothing more to reward the effort than a handsome rear view of a vanishing animal with his tail waving good-bye as he goes over the hill.

Then there is the elephant which presents a special set of problems to the camera hunter. The elephant sleeps through the day and eats in the cool of the evening and night. We spent weary weeks following various small

herds before we could catch them under light conditions which would permit the making of satisfactory pictures, and even then we did not know enough of their habits to be able to get close to them. We tried to solve our elephant problems by employing an expert, Boculy, probably the greatest of all the black elephant trackers in Africa. But then we often got too close and so we probably spent more time getting out of their way than we did making pictures.

We had been out on safaris for a little more than a year when Osa and I took stock of our results. We had spent a large share of the money appropriated for our expedition and we felt we did not have enough animal pictures to make a satisfactory production. We decided we would simply have to take more chances and get closer to the animals, else the whole project would be a disastrous failure. So we threw caution to the winds and with our hearts in our mouths went back at it. The fun started. We got pictures all right, but every picture was a chance with death. I am half afraid now that a good many of our elephant pictures are too good. They make the elephant look hardly more dangerous than a slightly discontented cow. To get



Water supply installed at the back of Martin Johnson's laboratory at Lake Paradise

these pictures of the elephant in his own private home life meant the invasion of places where we were never supposed to be, in terms of any common sense. Often we had to run for our lives, and once we had to shoot our way out of a very bad mix-up. I suppose we had fifty close calls before we were satisfied with the pictorial results.

A great deal of the elephant work was in the forest where pictorial problems are the most difficult. The wind tends to blow from everywhere, boxing the compass every few hours and carrying the scent of the hunter to all the nervous animals. The light is constantly changing with every change of position, and under the trees there is very little light at all. The trees and

grass absorb a great deal of the light and one has to give about twice as much exposure as on the open plains, because there is no reflection from the dark trunks and leaves. From about ten o'clock in the morning until three in the afternoon, just when the light is the strongest, is not a satisfactory time for making pictures because, with the sun nearly straight overhead, the shadows obscure details in the animal and at the same time make the general scene flat. Further, this is the worst period of the day for the shimmering heat waves which are the bane of African photography.

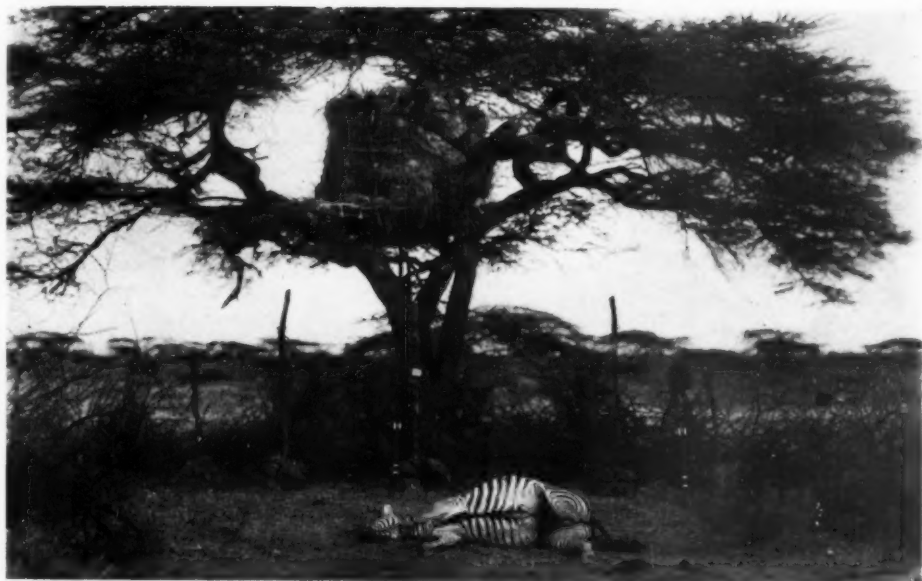
Besides all these smaller handicaps there are only about seven months of the year when one may expect good pictorial conditions. These are through the dry seasons, in the months following the two rainy periods. During the rains, with water abundant every-

where, the game scatters so widely that it is hard to find, and traveling is difficult. There is a slight advantage in camera-hunting the elephant during the rainy season, because at that time he leaves the forest for the plains. However, this is helpful only if one can be on hand at the time, for it is almost impossible to follow them for considerable distances.

Of course photography from blinds is practicable in the dry season only, where there are water holes to lure the thirsty animals into range. The blinds demand patience. They must be built and then left for a week or ten days before any attempt is made to use them so that the game will become accustomed to considering them a natural and harmless part of the landscape. One must expect, too, that a great deal of the effort made in blind work will be wasted. Often I



Mr. Johnson's open-air dark room while on safari. Daylight developing tanks were used and the water was cooled in canvas water bottles



The stage set for the making of a flashlight picture. The photographer enters the blind at night and, when a lion, a leopard, or a hyena comes to the "kill," presses a button that sets off the flash

have built a series of blinds commanding a water hole and then at the very time I started to use them the wind would shift inconsistently, against all calculations, and blow the scent toward the water.

I have one word of cheer to add to the lore of blind photography, however. After some years of research I find that the taboo against smoking in the blinds is all a mistake. The animals seem to pay no attention to tobacco. I am not sure why. Perhaps it is because they are familiar with fires on the bush and veldt and the acrid smell of smoke. But I am reluctant to libel the makers of my favorite cigars with any inference that their aroma resembles a jungle on fire. Anyway, it is perfectly safe to take comfort in a smoke while awaiting the coming of the animals.

The blind work on our last safari was the most difficult that we have ever experienced. This time, on top of all

the natural difficulties, politics came to complicate affairs. A former head of the King's African Rifles on the Northern Frontier of British East decided he would solve all the problems of the territory by remarking the map. He moved the tribes about like checkers on a board, putting each tribal unit into a new and unfamiliar locality, with new neighbors. The result was that none of the natives knew the regions that they were compelled to call home. This made them unhappy and restive. It also ruined water-hole photography in the district. The natives, being unsettled, scattered about all the water holes, and built manyettas everywhere, driving the game away and making it wilder than ever.

On this last safari I managed to pay several natives to move t' eir manyettas to other watering places with their cattle and sheep and camels, leaving me three good water holes for photography. But it was weeks before the game came

back. Then, when I built my blinds, I encountered several weeks of murky weather. After the clouds cleared away, the country became so dry that every movement filled the air with alkali dust, and then came prairie fires to add smoke to the trouble. I was five months on two safaris before I got pictures. It is about the last word in camera troubles when one has to buy a water hole to give a zebra a drink,—and then gets burned out.

Another photographic problem in Africa is the preservation of sensitized materials and chemicals. Photo emulsions are made of a highly sensitive gelatine impregnated with delicately balanced silver salt solutions. Conditions of humidity and temperature affect the film which must be continually safeguarded. This means the use of carefully sealed tins, special drying compounds, and a continuous supply of fresh stock. I kept a steady flow of shipments arriving every few months from the Eastman Kodak plant in Rochester. But delivery out in the blue is something more of a problem than it is in civilization.

It must be realized, too, that a camera safari is a much more pretentious and exacting undertaking than a mere hunt where one is concerned only with food and ammunition. The photo equipment alone runs to considerable weight and it must be carried in duplicate to guard against losses and accidents. On one safari, when Daniel Pomeroy was with us, we left Nairobi with six motor cars and about forty porters. We traveled three days to the north and spent ten days trying to

get rhino pictures. We saw thirty-nine rhinos in the ten days and got close to many of them—for a moment. But always they grazed with fiendish persistence in places where photography was impossible—or else the light failed us. We had to leave after that difficult and costly trip without a picture. A few months later we returned to this region and made a wonderful series of rhino pictures in only three days, photographing the animals often as close to the camera as fifty feet. When the rhino is that close he may charge to kill at any moment. There really is such a thing as luck—in Africa.

The long safaris take up a great deal of time in going through gameless regions. Often we have made safaris from Lake Paradise requiring five weeks' time to do one week's work, and once we made a long camel safari into the Ndoto Mountains when we did not picture one animal. They had all migrated to the Horr Valley where we did not dare to follow because the wild Habash raiders were in there to poach ivory. The Habash do not like to be disturbed at their poaching, and there are some chances we will not take—even for a picture.

A whimsical thought comes to me. Now that the safaris are over and I am back in New York, I have boiled my pictures down to about two hours and fifteen minutes of screen time—what is left out of about 200,000 gross feet of film. That means that the essence of what I got actually occupied the camera for just one hundred and thirty-five minutes. This article may help to explain what I did the rest of the four years.



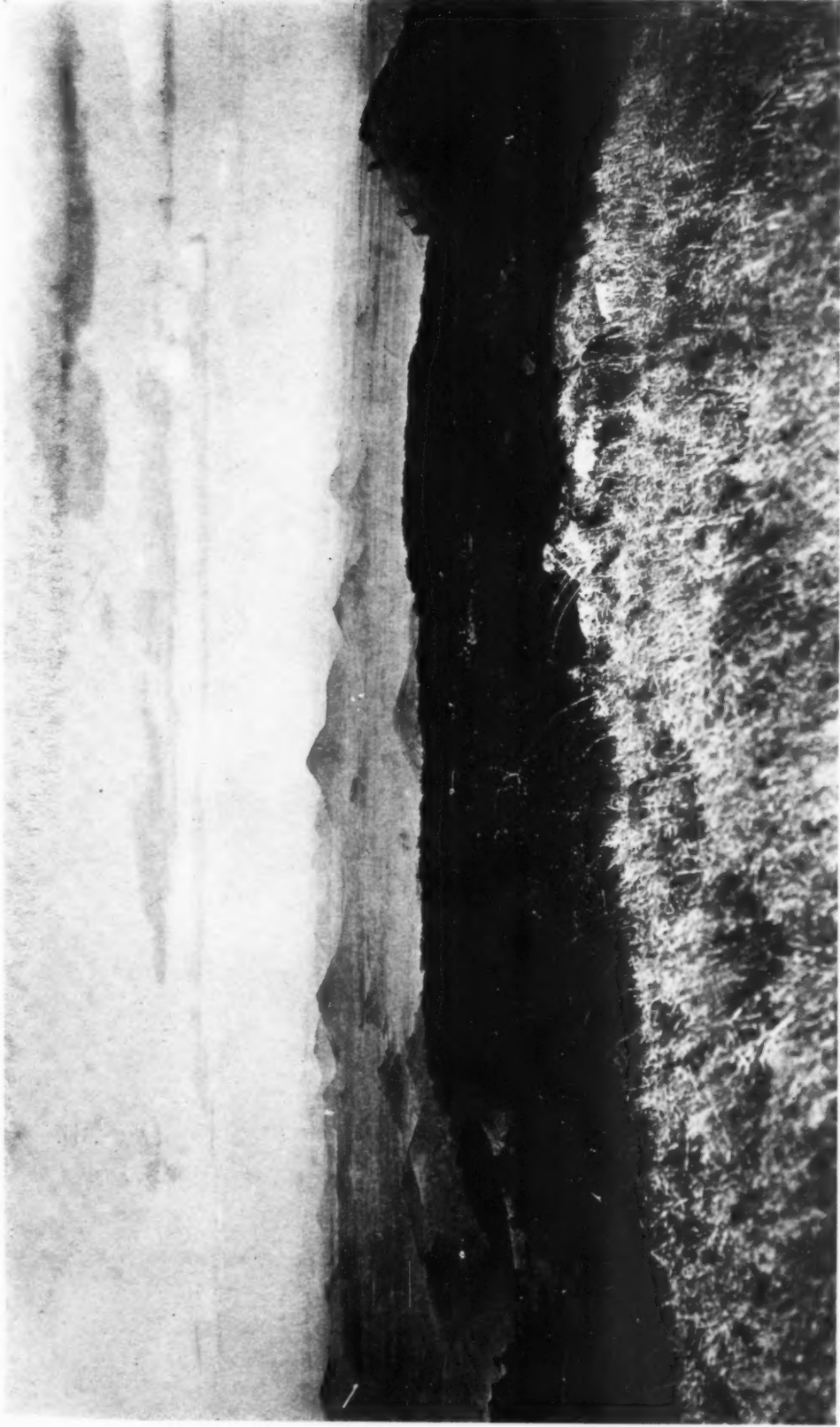
*A
Lumbwa
Warrior*

The Land *of* Glorious Adventure

A series of sixteen photographs by Martin Johnson taken during the four years he spent in Africa making his motion picture record of African wild life and African natives



A MARABOU STORK KEEPING AN EYE ON THE PLAINS FOR A CHOICE MORSEL OF FOOD



LOOKING OVER THE KAISOOT DESERT FROM THE LAKE PARADISE FORESTS. ALL THESE HILLS ARE EXTINCT VOLCANO CRATERS



WILDEBEESTE ON THE PLAINS OF SERENGETI IN TANGANYIKA

The animals migrate with the season, following the grass and water. Sometimes as many as 20,000 are congregated at one point, and for Martin Johnson to see 100,000 in one day was not unusual.



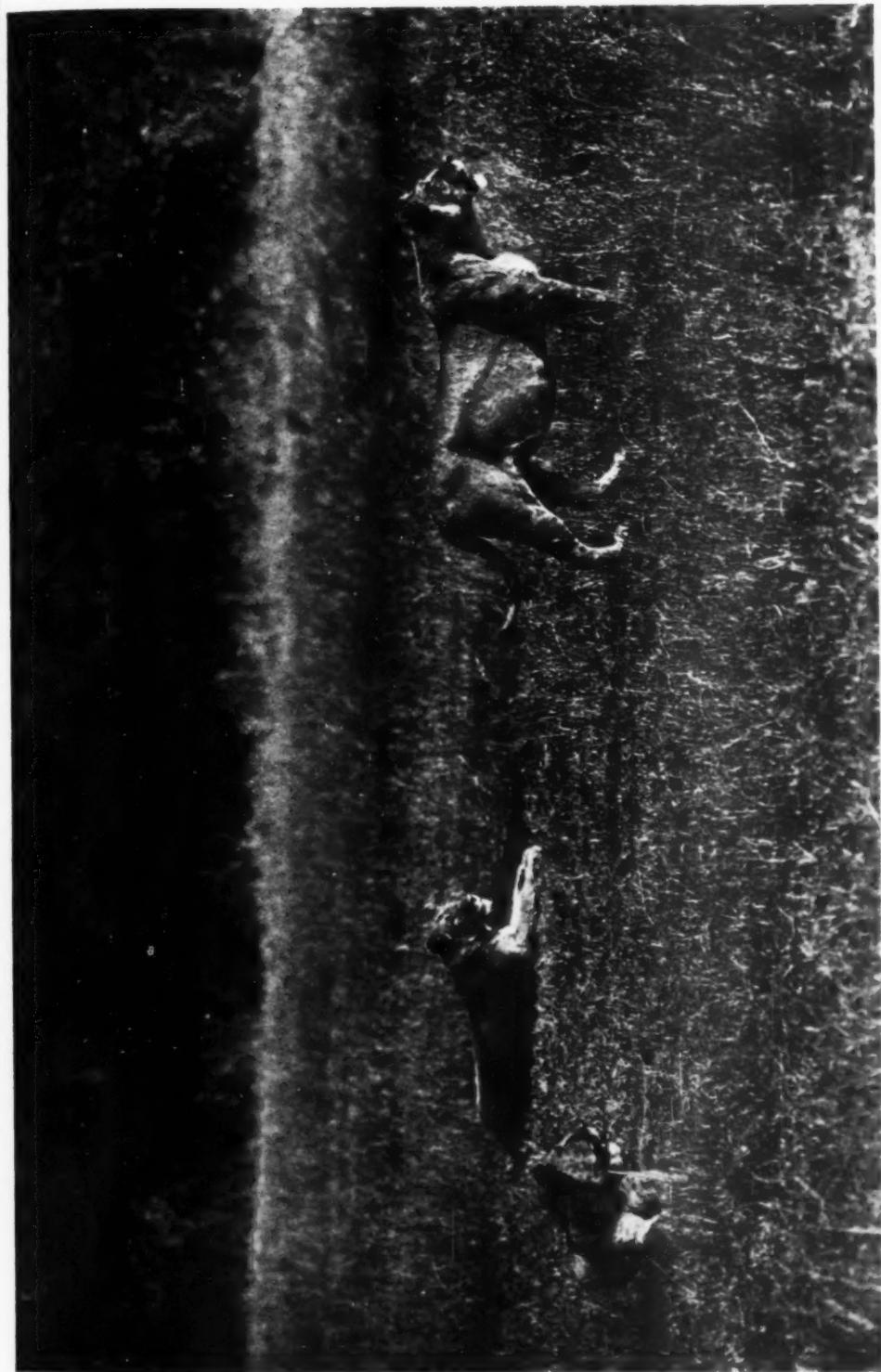
ORYX AT A DESERT WATER HOLE

The water here is very alkaline and muddy and there is little of it. Only half a mile farther there is good water coming up through reed beds, but the game, fearful of lions and leopards, will not go near it



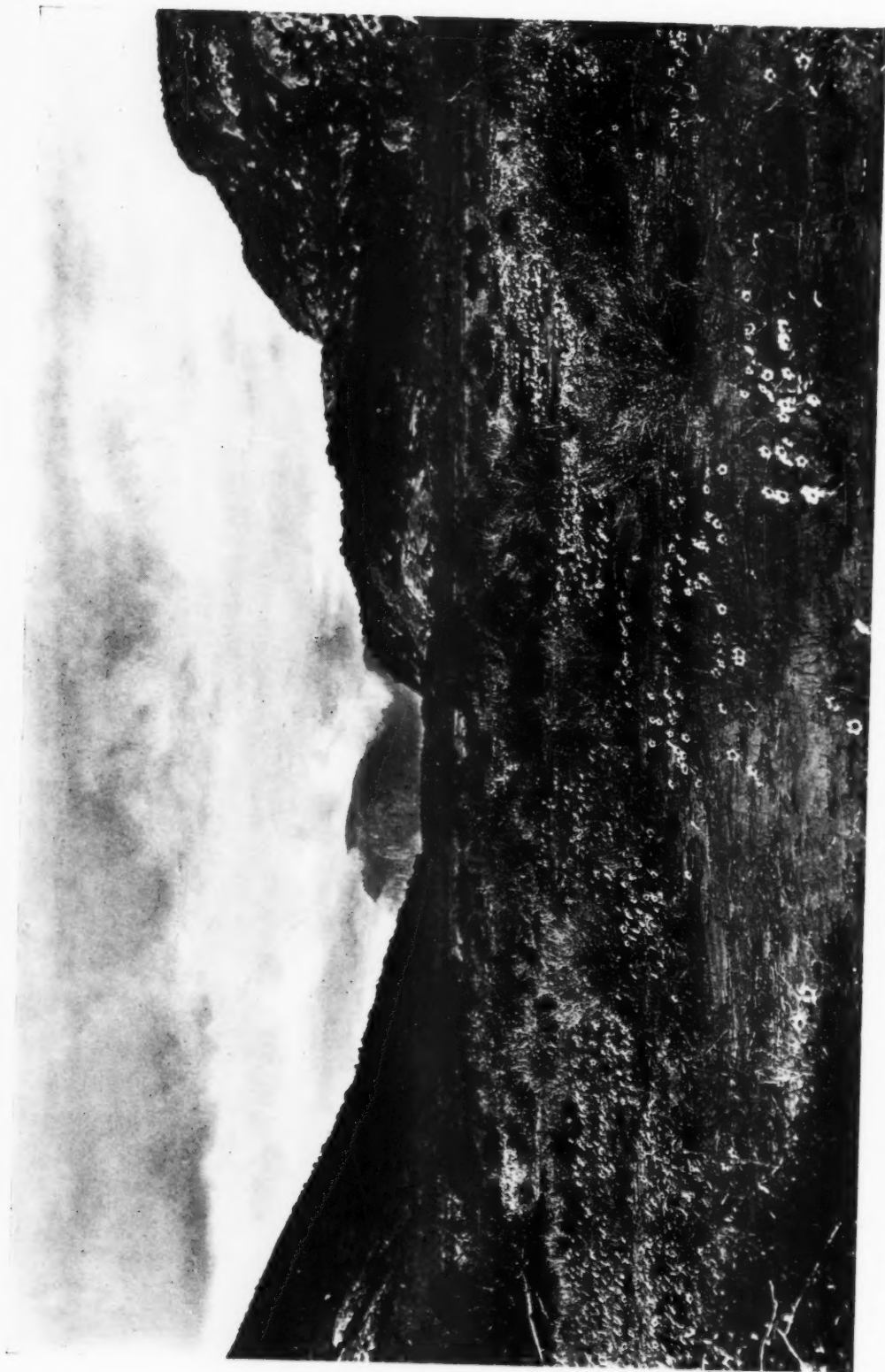
ELAND, ORYX, AND ZEBRA AT A NORTHERN FRONTIER WATER HOLE

The eland (the fine specimen in the center of the picture) came every day, always alone. Note the ostriches in the background

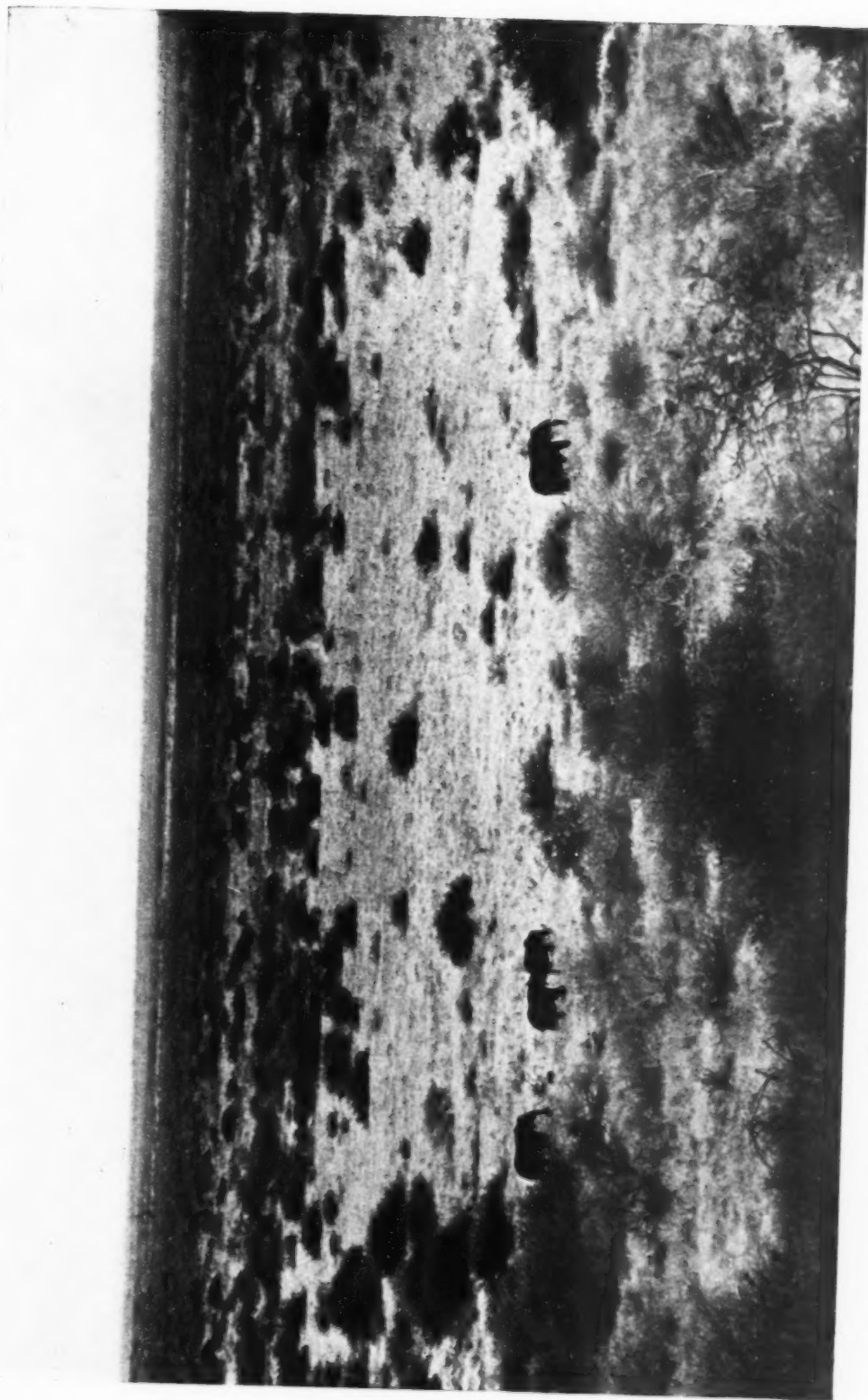


ONE OF THE GREATEST LION PICTURES EVER MADE

Well-fed, content, and never having been molested by man, the lions in the Tanganyika valley were easy subjects for the photographers. More than one hundred pictures were made, showing the animals playing, feeding, rolling on the grass, yawning, and even roaring



ON THE PLAINS OUTSIDE THE LAKE PARADISE FORESTS
After a rain the flowers spring up in profusion and are beautiful for a week or two. Then they wither and are blown away, and the plains once more become deserts

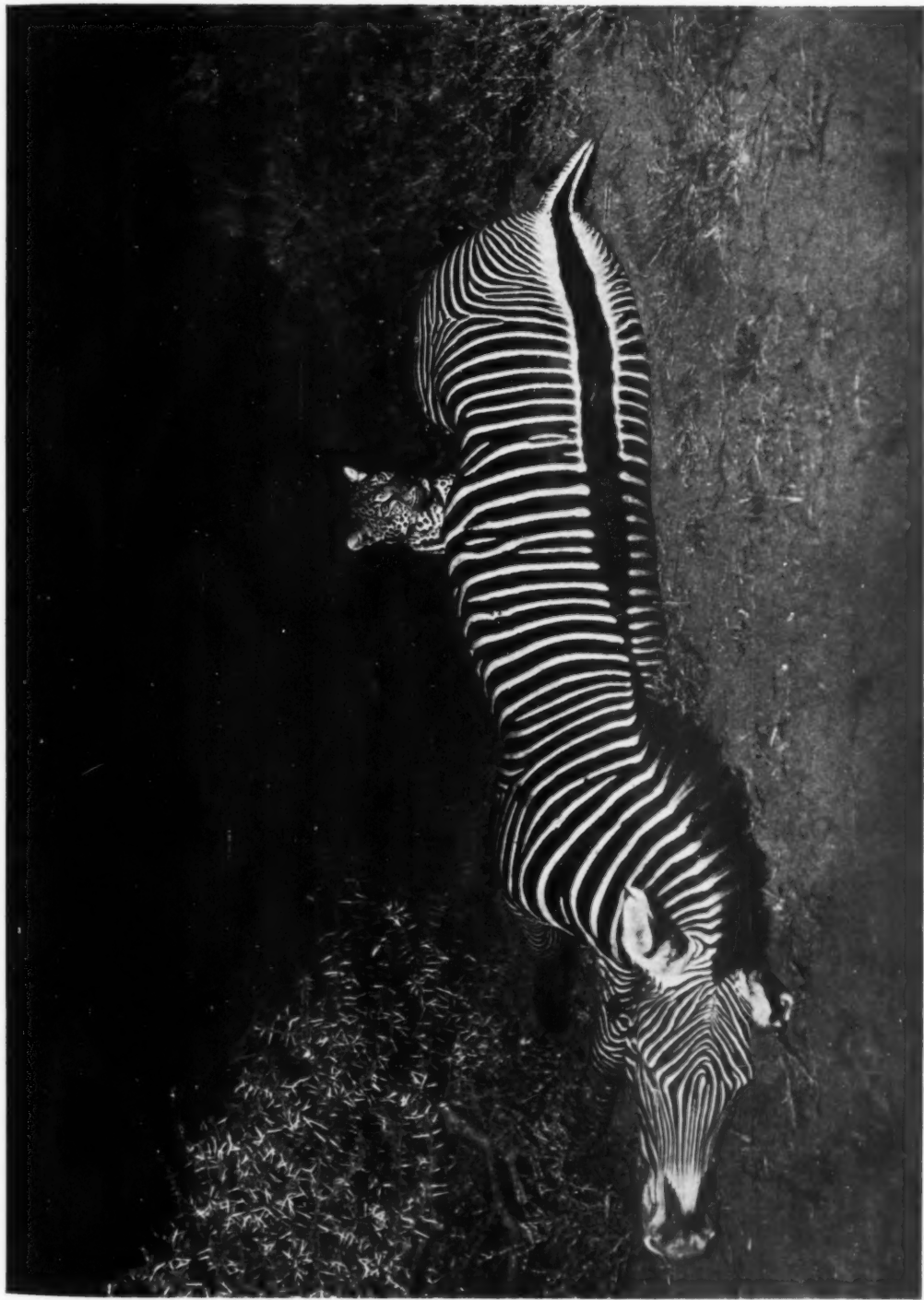


ELEPHANTS ON THE EDGE OF THE KAISOOT DESERT AFTER THE RAINS

Note the baby elephant just visible above the grass; it was probably born the night before, and the herd is moving slowly, stopping every minute in order not to tire it out



HYENAS ON A WILDEBEESTE KILL



A LEOPARD INVESTIGATES A GREVY ZEBRA KILL

The leopard's cubs could be heard whining in the distance while Martin Johnson was taking this picture. Although he waited an hour, hoping the mother would call her youngsters to the feast, she did not, and in fact, she was so nervous that she did little eating herself



IN SEARCH OF JUSTICE

An old Boran awaiting his turn to tell his troubles to the District Commissioner at Marsabit. These people have great faith in the judgment of the British and accept their decisions without question



NDOROBO HUNTERS

The Ndorobo hunters were so shy that it took Martin Johnson two and a half years to get within talking distance of them. Once their reserve was broken, they became very friendly, and would often tell the Johnsons of game in the vicinity



HEADED FOR THE SWEET POTATO PATCH

Elephants like sweet potatoes, and the Johnsons conceived the idea of planting a sweet potato patch to lure the animals within flashlight range of the camera at night. This cow elephant visited the patch every night during the dry season and often would bring her mates along for dinner



RETURNING FROM THE FEAST

The Johnsons made many flashlight pictures of "Lady Sweet Potatoes," as they called their nightly visitor, but she never seemed to mind. Perhaps she mistook the flash for lightning. When the wet season arrived, she disappeared for three or four months, but she



ABYSSINIAN BUSHBUCK

After drinking at Lake Paradise, these little animals started up the trail and photographed themselves by touching a wire. They are so shy that the Johnsons did not see more than four individuals during the three years they were at Lake Paradise

"At Home" in Africa

The Johnsons'
pet at Lake
Paradise



By
OSA
JOHNSON

SAFARI life in Africa is something like what I imagine war would be with the fighting left out. There is glamor and adventure and a constant change of scene. One moves with a little army, outfitted and organized and commanded just like an expeditionary force. And there is always movement, on and on and on. There is always an objective ahead and once it is attained there is always another farther on.

I am reminded of the homely wisdom of an old lady who lived out on the plains of Kansas, who often commented on this world of strife and work by observing "the cows with the long horns are always ahead." It is so in Africa on picture safaris. The elephant with the big tusks, the lion with the big mane, the rhino with the record horn—they always seem to be just ahead. So one goes on and on.

And so it happens that Martin and I have lived our lives together mostly on safari, always going somewhere, nomads of adventure.

In spite of this we have also always managed to have a home. Our home is where we happen to be. Martin's special business and concern is the camera work; mine is the home-making on the way. Of course it works out so that both of us have our share of everything, from the planning and

organization to the adventures and the excitements, but a wife is a wife and a home-maker, even on safari. My time in Africa is about equally divided between

standing guard over Martin and his camera with a double-barrelled elephant rifle and seeing that the safari cook keeps the home fires burning at dinner time.

The magazines for home-making women in the land of civilization are filled with systematizing plans, budget charts, and things like that. If system is necessary in the stationary, permanent home surrounded with all of the conveniences and services of the city, with a telephone handy to take care of any immediate household emergency, then system is about ten times as necessary on safari, where one has to carry along everything for living, including all the civilization that is necessary to comfort.

Sometimes our friends who see our pictures are surprised at the extensive equipment we carry, the large number of porters, or camels, or cars and wagons trekking across the veldt. That is because we really do have to take home along with us. The American sportsman and the American sportswoman, too, go hunting or exploring now and then, as a relief and an escape and diversion from the pressure

of civilization and its complications. But we live on safari practically all of the time. We have been camera-adventuring out on the edge of things and "in the blue" for about seventeen years. Naturally we have not the same zest for "roughing it." We must get the maximum of comfort if the work is to be well done and if we are to have a life of our own at all.

Our last expedition to Africa, taking nearly four years, is typical. To get our records and screen stories of undisturbed and unspoiled animal and native life meant that we had to push way out beyond the white man's influence. And that meant some peril and considerable hardship and all the organization and "home-making" skill we could muster to make the living and the work endurable. The first step was the long safari of nearly five hundred miles from Nairobi, in British East Africa, up to a remote region not far from the border of Abyssinia, where our own Lake Paradise nestles down in

the bottom of the crater cup of an old volcano, surrounded by jungles and a rim of forest, and outside that for hundreds of miles a desert country infrequently dotted with water holes and oases and bits of bush and forest. Lake Paradise was in a sort of way "home," with houses built of mud and sticks and thatch, and between seasons we did spend months there. But after all, it was really a place to go away from while we followed the wild life out across the veldt and into the jungles.

With runners and with cars we could keep up a kind of communication with Nairobi and its source of supplies, but we had to plan to take with us to Lake Paradise all of the equipment we were going to need and enough supplies for at least a year. A great many housewives get into a fret trying to decide what they are going to serve for dinner tomorrow. In Africa the problem was what to have for dinner for maybe about three hundred tomorrows. To help the systematic administration of



The cook's box designed and made by Mr. Eastman for Mrs. Johnson

affairs along we built a "store" at a part of our Lake Paradise establishment. It was our store, and we were the only customers. In this building stocks of foods, canned goods, flour,

Take for a detailed example the matter of soap. The African black boy can do an excellent job of washing clothes. He does it surprisingly well in view of the fact that he himself wears



Building the laboratory at Lake Paradise

sugar, coffee, and everything of that sort, were stacked around on shelves.

This enabled us to keep track of the rate of consumption so we could replenish when necessary. It helped to keep down waste, too. African native servants have no very provident notions and they never heard of economy. They learn the white man's ways and requirements so they can serve in an automatic sort of way, but you cannot trust them ever really to understand why things are done. That is not to be expected. We have been centuries working out our civilization and our notions about things. We must not expect the black man to get it all in a few years.

practically no clothes and he only washes himself under the pressure of management. But he can never understand the magic of soap. If I gave a black boy one of Martin's shirts to wash and one bar of soap, the whole cake was used on the one shirt. The black boy likes to see the bubbles and the suds. He has no idea of the cleansing properties of soap, except as it might be some kind of magic stone. He thinks it is necessary to rub every inch of the garment with the soap in order to get the dirt out. My laundry boys were thrown into despair when I introduced flaked soaps and washing powders. The only safe solution of the problem was to issue the soap in

bits, just enough for the job in hand.

It is curious that all the domestic work has to be done by the black boys—I may explain that any black man is a “boy” in the language of East Africa, no matter if the “boy” happens to be fifty years old. I found boys that could do neat sewing and mending. They could darn stockings and sew on buttons as deftly as any French seamstress. But the native women were utterly hopeless about such work. They had no feeling for it and not enough initiative ever to learn.

We took along garden seeds and tools and a few coops of chickens on our trek to Lake Paradise to be prepared to do a tiny bit of “homesteading” up there. So I had a garden with the vegetables that we needed to make it seem like home, and many of the garden flowers that we have back here in the United States, even roses. Also Martin insisted on big patches of sweet potatoes because he discovered that the elephants liked them. I supervised the gardening and I expect I am the first to raise a garden for an elephant pasture. There is a standard joke about the small boy who works his way into the circus by carrying water to the elephant, but Martin worked his way into a lot of very fine elephant pictures by having his wife run a sweet potato ranch. There were many elephants in the Lake Paradise forest and at the desert water holes in the surrounding region. Our place got highly popular with them, and the big bulls, their cows, and young, would come crashing around in the dark of the night to dig the sweet potatoes. Martin set flashlight cameras at night to get the elephants, and in the daytime I had to have a force of boys setting sweet potato plants. I mention this as one of the little details of

gardening and home-making in Africa.

My little flock of seventeen chickens flourished up at the lake and multiplied rapidly. I soon had two hundred chickens. Then one night a prowling leopard got into the chicken yard and the next morning I had only one hundred chickens. I might have spared a half dozen to a leopard, but somehow I think a hundred broilers at a time are really too many for any cat. I should have liked very much to have had that particular leopard made into a nice fur coat. But we had no shooting whatever at the lake. That was part of our code of life and work. We were in Africa to photograph animals, not to kill them, so we got along with them as best we could and kept out of trouble with them as much as possible. We wanted pictures, not pelts and mounted heads.

So that we could avoid shooting even for fresh meat, we kept herds of cattle and sheep, bought from the Boran natives of the desert country. The African cow gives little milk, perhaps only about a quart or two a day, but it is very rich, almost all cream. We had plenty of cows and every third day we had freshly churned butter. Also we had a little portable ice machine, operated by hand power, so that on special occasions we could even indulge in ice cream. There is a great thrill in a mere dish of ice cream when it happens to be served out in the desert, half way around the world from New York.

We contrived to get a good deal of home atmosphere into the Lake Paradise place. Because of the nature of the available materials and the native methods of construction, each room that we wanted was made a little house by itself. My boudoir was a thatched-roof house with mud and stick walls. It sounds crude enough but really the

interior was as feminine and civilized as any woman could wish. I had it floored with boards taken from cases of tinned goods. The walls were smoothed and tinted with a wash of pink clay that gave a wonderfully soft chalky color quite as handsome as

photographed in our immediate vicinity, a lot of planning had to be done about the supplies. When we first started these trips I simplified the problem by packing a case for each week of the trip. Each case was a "load," which means the unit of a



Looking toward the fireplace in the dining room at Lake Paradise

any interior decorator could contrive. And I had cretonnes and soft skin rugs, and chairs also made from packing boxes, with trig little cretonne covers on them. My black maid kept it as neat as could be, after a long course of lectures on the subject. I could come off of safari and get out of corduroys and khaki clothes and boots and slip into fluffy feminine things in this room and forget all about the excitements of the chase in a moment. Once inside that room one could imagine it a boudoir in a Long Island bungalow or any country place.

When we went out on our many long safaris in pursuit of pictures of various animalst that could not be

one-man load, or what can be carried by one porter, about sixty pounds. This meant that if we were to be gone for two months there would be eight loads or chop boxes. Later, as I became more experienced in the planning, the requirements were worked out in quantity. For instance I knew that one load, or sixty pounds of flour, would be ample for a month of safari, and that one load of sugar would last for the same period.

While on safari we added variety to our diet with occasional game. Most of the members of the big family of antelopes are good to eat. Their meat is like venison. Also the African buffalo supplies perhaps the most

delicious steaks and roasts in the world. Buffalo tongues are great delicacies. And ox-tail soup made from the buffalo is superior to any that we ever had from beef. Some of the meat was at times smoked and dried into what in Africa is called "biltong," which is the veldt equivalent of the "jerked" meat of the American plains in the days of the buffalo. Then we often had fish, too. Martin says that every time I saw more than a pint of water I had to go fishing. We caught many varieties of fish. The African waters offer cat-fish and fish like the American perch. In some regions, where the sporting influence of the British has extended, brown and rainbow trout have been planted and they have naturally extended their range until one comes on them in surprising places.

And speaking of that scattering of new species reminds me that our Lake Paradise gardens may some day complicate things for some exploring botanist in Africa. Tomatoes escaped from our gardens, and with seeds scattered by birds, are now growing wild for at least twenty miles out around the lake. Just imagine the excitement of some plant collector maybe a hundred years from now breaking into that old crater at Lake Paradise and finding a tangle of red damask roses and a bed of petunias!

Part of our problem of living was teaching the cooks to make American dishes. We got fairly well trained cooks, but their experience had all been with British hunters and their cookery was after the English manner. "Pishi," a black Mohammedan, was our star cook. He soon learned to make waffles and cakes after my favorite recipes. He did a fair job on pies, too. But there were times when I just had to take over the pie-making my-

self, to please Martin. We had tinned fruits for pies and sometimes wild fruits, too, that were exceptionally good. We also had wild mushrooms and a wild green that passed for spinach. I was thrilled when I found that after every rain we could gather wild asparagus out at the edge of the Lake Paradise forest.

Operating our safaris also entailed established routine to insure comfort. Each boy in the army of about fifty or a hundred porters had a prescribed and routine set of duties. Within twenty minutes after we had arrived at a camp site there would be hot water ready for baths and tea. And a meal would be under way before the unloading of the camels was done. Our tents would be ready in a jiffy, and less than an hour after arrival we would be completely "at home," in fresh clothes and ready to sit down to dinner. A similar swift routine of breakfast and packing and loading in the morning got us under way rapidly. Keeping to schedule is important, too, in the desert country. One must travel in the cooler hours and allow for long rests. Camels, in spite of all their reputation for endurance, can go only about two miles an hour and about two hours at a time.

But certainly my life in Africa was not all a matter of home-making on safari. I had my excitements, too, so many of them that they do not seem so important in memory as when they were happening.

I think it is pretty well known by this time that we are not big game hunters—in fact we shoot only when we have to in order to protect ourselves while making pictures—or as now and then happens, when we must have meat and can't buy cattle or sheep from the natives.

During the six years we had been photographing the wild animals, we had saved every head-skin, until we had about thirty, but we did not have the greater koodoo, neither did we have a very large buffalo, so Martin and I talked it over and it was agreed that we would get the two if the opportunity arose.

About a day's travel from Lake Paradise out where the desert is dotted with bush-grown gullies, I came upon a fine specimen of a bull buffalo with handsome horns. I stalked him a long way over rough country and then lost him in a thick tangle of bush. I went in after him, which was not such a very careful



Mr. Eastman and Mrs. Johnson baking bread while on safari

We were preparing to leave the Lake and return to America; Martin was busy doing last-minute developing in the laboratory, and, as I had nothing to do and time was hanging heavily on my hands, I decided to go after my buffalo, and I wanted the thrill of getting it alone. Martin was opposed to the notion because he holds that the buffalo is the most dangerous animal in Africa. But I managed to make him see my point, and so it was that I set out with only two black boys and a gun bearer to a point outside our forests where a very big buffalo had been reported.

thing to do. The buffalo is hard to see in the bush, and he is just about certain to come on a killing charge if one gets too close. I hunted through the bush and was about to give him up. Then I came on a little native village and got two spearmen to go beating through from the opposite side of the big thicket. I guessed that the buffalo would come out the same way he went in, since he had seen nothing on that side to alarm him. My guess proved correct. As the beaters came through the bush shouting, the buffalo came raging out. He saw me and headed for me at express-train speed. There was

just a moment when I would have been glad to have been safe back at Lake Paradise, or most anywhere else. But the situation was not one for a great deal of debating. I got hold of myself and determined to be cool about it anyway. I drew aim and fired at the buffalo charging head down. He was less than thirty feet away when he fell, stone dead. My bullet went through the "boss" or heavy hard crown of his skull. It is said to be an almost impossible shot because of the extreme density of the bony structure. The performance made me decidedly proud of my rifle.

Anyway I had my trophy. By the time I got back to Lake Paradise with the buffalo head and hide I was able to be unexcited and casual about it—when I told Martin the story.

My hardest chase was another lone-handed hunt of six days on the trail of a greater koodoo. The koodoo is one of the rare antelopes of Africa, seldom

taken by sportsmen. One day at the edge of the Lake Paradise forest I sighted a big male koodoo through my binoculars. He must have been nearly two miles away. I set out after him. The chase led me over the roughest kind of country, up and down ravines and into the mountains. There were places where I had to climb sheer walls of rock for at least a hundred and fifty feet, hanging on with toe hold and everything but my teeth. Fortunately I can climb well. I admit it. I studied the subject in an apple tree back home in Kansas when I was a little girl.

There were places on this koodoo chase where I had to pass my gun up and down cliffs with my black boys forming a chain like a bucket brigade. I literally wore out two pairs of hunting boots on that trip. I was determined to get that koodoo. But there is an end to every chase. I finally got within range of him, although it was a rather



Gathering the vegetables in the garden at Lake Paradise



Wild asparagus grows in great quantities near Lake Paradise. The Johnsons liked it better than the cultivated asparagus of civilization

long shot at that. I fired at three hundred yards and brought him down. Then with a quick second and third shot I finished him. I had the boys take the head and the whole body skin, and we started back to Lake Paradise. We traveled as fast as we could, back through that tangle of jungle and thickets and gullies and mountains. It was late in the night when we got back. I hate to think now of the scares I had as we passed shadowy places and clumps of bush which may have been hiding places for most anything in Africa.

The rhinoceros is one of the perils of travel, as much by night as by day. The rhino always charges when in doubt. He is made for charging and his big horns are terrible weapons. I think the rhino has inspired me to the breaking of all world's records in fast and lofty tree climbing.

The rhino often just voluntarily happens along to break up the monot-

ony of a quiet evening in camp. I remember one occasion out of the Kaisoot desert when, late in the evening, we had a small fire over which we were boiling water in a five-gallon gasoline tin. The rhino took a dislike to the sight, and with a snort, shot through the camp, impaling the tin on his horn. The sudden bath of boiling water merely added to his speed. He went out into the darkness of the African night like a comet.

Often at night rhinos would charge through camp that way. One morning one of the boys came telling of the excitements of a rhino charge the evening before, after Martin and I were asleep. He was making fun of the fright of the other boys, including considerable mimicry.

"And where were you?" I asked him.

"I was very, very far up a tree, Memsab," he answered, "because you see I am my mamma's only boy."



Camel safari crossing the Kaisoot Desert

Adventure Land

By PHILIP PERCIVAL

Mr. Philip Percival is a famous "white hunter" living in Nairobi, British East Africa. "White hunter" is the designation evolved in that region for those agents of adventure who conduct safaris for sportsmen and explorers in the jungles and on the veldt of Africa. The white hunter is therefore an authority on the wild life and the natives of his territory. He is really an advance courier of civilization and the contact by which the civilized world learns of the great wild places. He must be first to seek out the unknown and unravel the mysteries of the far lands that we call "back of beyond" and out "in the blue." The white hunter in a very broad and constructive sense stands as the interpreter between the world of the wild, the primitive, and the savage, on one side, and the complex world of civilization on the other side as represented by his clients. Mr. Percival has had twenty-five years of safari experience in Africa, with many colorful adventures and contacts with the most famous sportsmen and scientists of both North America and Europe. His brother, Mr. Blaney Percival, was for many years the game warden of British East Africa.

—THE EDITORS.

B RITISH East Africa is Adventure Land and Nairobi is its capital.

It may be taken for granted that I think exceedingly well of the region and am likely to speak with considerable enthusiasm of its lures and charms because I have made it both my home and my profession. Also this Adventure Land must surely have a special interest for the readers of *NATURAL HISTORY* and to Americans in general. Probably most of what the great American public has learned of Africa has been communicated by the screen and by the reports and collections of museum expeditions. British East has contributed a most imposing proportion of the African trophies of both the screen and the museums. First came the screen records by Paul J. Rainey

in his famous *African Hunt* pictures made chiefly at the Lasamis water hole. Since then your own Martin Johnson has spent some years in our country, sending back to the States nearly half a million feet of screen records of wild life. And this region, too, was a favorite collecting ground for the researches so ably conducted by the late Carl Akeley in his indefatigable efforts toward the projected African Hall of the American Museum. In addition, many famous American sportsmen have come our way, including more recently Daniel E. Pomeroy, of the Museum board, and George Eastman, to enjoy the thrills and wonders of British East.

Specimens of the amazing fauna of British East appear as important ex-

hibits in most of the great museums of the world. So mayhap I have warrant for my assertion that Nairobi is really the capital of Adventure Land.

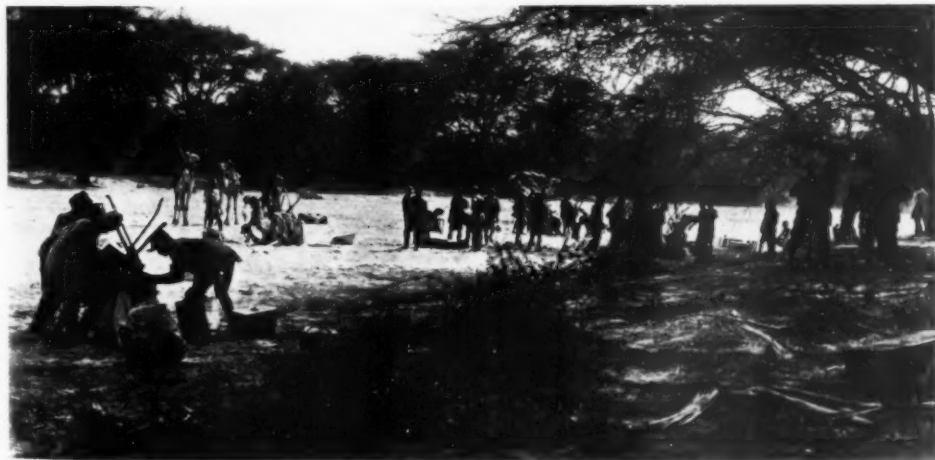
Our city of Nairobi—and it is truly a city, with a white population of nearly 4000 and some 8000 Asiatics—is itself a creation of adventure and chance. Back in 1899, as the laying of steel for the Kenya and Uganda railway was pushed through from Mombasa to Kisumu on Lake Victoria, it was adopted as a railway settlement. It was a convenient site because it was located at the inner edge of the grassy plains close to the beginning of the ascent to the upper highland country. Its delightful climate and central position led rather automatically to development.

The safaris for all of British East and most of those that penetrated into Tanganyika organize at Nairobi. It is the place to which you come to go anywhere “out in the blue.” Depending on seasons and varying conditions, one may expect to find good sport and occasionally fine specimens within easy range, say from twenty to two hundred miles, from Nairobi. And

there are an infinity of objectives for longer safaris out into the completely wild and unspoiled country.

Civilization is making its gradual encroachments in the regular pattern of development of every new country. First come the trader, the missionary, and the explorer, and after them come in time the prospectors, the settlers, and the farmers, each widening his circle of operation until the whole country is claimed for civilization, agriculture, and industry. Happily in the vastness of Africa there is ample room. For a great many years to come there will be an abundance of wild life. Meanwhile the development of the country means the building up of centers which give the sportsman and traveler assurance of bases of supplies and services and comforts which earlier were unobtainable.

Despite the comfortable facilities of Nairobi and its shops, hotels, and clubs, one must not hasten to the conclusion that British East is yet in any danger of being shorn of its thrills and color. From every train which comes up from Mombasa on the coast to Nairobi one can see vast herds of wild game, thou-



The Eastman-Pomeroy-Akeley East African Expedition breaking camp



Pat Ayre has the reputation of being one of the best white hunters in Africa

sands of head at a time, with now and then a glimpse of a lion.

The lion is amazingly persistent in British East despite unceasing pursuit by safaris and the war against him by settlers and natives alike. There is a

large swamp within three hundred yards of the railway where it is estimated that not less than twelve or thirteen hundred lions have been killed since the road was built.

There is, I find, in the States a bit of an adage to the effect that "when Greek meets Greek they start a candy store." By some such law of racial predilection, wherever one goes on this globe and finds Englishmen, he is certain to find golf and also, if possible, trout fishing. So among our surprises for the visitor are some excellent trout streams, stocked in years past. The Kenya Angling Society brought in brown trout in 1912 which are thriving. Rainbow trout from South African waters have also been introduced with success. It is not unusual now to take a six-pound brown trout on the fly in our waters, and rainbows up to ten pounds in weight have been taken. It is amazing to record that fry planted in new waters seem to reach this size in only three years due to the wonderful amount of food in the rivers. The



Motor cars of the Eastman-Pomeroy-Akeley East African Expedition crossing the northern Guasho Nyero River

local fish do not go up into the cold streams that have been stocked with trout, and the trout do not go down into the warmer water. Our best fishing is in the Aberdaire mountain region. Just as proof of the sporting quality of our country, let me boast that even the lowly barbel, or as you call him, catfish, will sometimes take the fly in British East Africa. The one bit of advice I would venture to the fisherman who intends to try African waters for trout is to bring short rods, the sort suitable for brushy streams and rough country.

Concerning safari equipment in general, it may be observed that there is no actual necessity for taking anything to Nairobi. Everything from guns to clothing may be obtained there, of the types and materials best suited to the requirements of the country. Many sportsmen have gone to vast trouble importing equipment to find on arrival that they could have done much better on the ground and at less expense, all



Philip Percival, known as the best white hunter in Africa, has to his credit 25 years of safari experience

costs considered. Of course it is to be expected that sportsmen are likely to want to bring favorite guns. In addition to the heavy bore rifles for big game, it is advisable to add a twelve- or sixteen-gauge shotgun for birds and perhaps a small .22 calibre rifle. One can have a lot of fun with



Canvas tarpaulins cut to the shape of the automobiles make camping possible wherever one happens to be at nightfall

a .22 and it can be fired without disturbing the more important big game in the adjacent country.

Every competently organized safari includes expert native skinners and the proper supplies for preserving heads and skins for subsequent treatment by taxidermists.

It should be borne in mind that while wagon and motor-car transport is available for many journeys, the native porter is still the mainstay of transportation in many regions and for at least a part of the work of nearly every safari. This means that the equipment must be susceptible of division into loads of not more than sixty pounds each, a one-man load. Some of our sportsmen have their sixty-pound chop boxes packed at home and send them half way around the world in shape ready to go on the porter's shoulder. This expedites matters at the start and often is a safeguard against oversights and disappointments that could have been avoided by careful consideration in the planning in the leisure of home.

In Nairobi there are several highly competent tailors and the matter of special safari clothing can safely be left until arrival. The East Indian tailors are especially expert in making up khaki garments, and a London tailor at Nairobi can supply woolens, ducks, and suitable hosiery and boots.

The conditions of the climate are such that tents should be rot-proofed. Green duck is the most satisfactory. "A" tents with an ample fly and veranda awning and floor cloth are found the most satisfactory.

The choice of the season for safari is important, with many conditions to consider for the varying types of game. In the dry season the elephants are to be found chiefly in the forests, while in the wet season, when grass is abundant, they range out into the bush country and can even be found on the plains. The game movements are largely controlled by the food and water supply, and the lion will be found following the game upon which he preys. Another factor to be considered is the competition between the natives with their herds of cattle, sheep, and camels, and the wild life. The dry seasons are struggles for water out on the veldt and often the native herdsmen monopolize water holes and the game is driven away.

The wet season is not a matter of continuous rains such as one fancies prevails in the tropics, but each day in the season there is rain for a few hours, then sunshine. These conditions make traveling most difficult and expensive. Probably the best period for general game is from about May 1 to October 1. The second dry season runs from about December 1 to March 15. April is actually the only month really bad for hunting, the ground then being pretty well water-logged.

But, to be sure, I must admit as a good East African that every season is a good season, and that there is always good sport and prospect of high adventure. I have heard it said that Southern California has good weather. So it may be becoming to observe that our climate is in many regions closely similar. This I believe is just praise.

Painting the Backgrounds for the African Hall Groups

By W. R. LEIGH

"IT is just as important that the backgrounds be correct as that the animals themselves be so—just as vital as the Arizona settings in your Indian and horse pictures!"

It was Carl Akeley who spoke.

Seated on the opposite side of a luncheon table I felt with a glow of pleasure that my vis-a-vis was indeed the born artist of whom I had heard and read—an uncompromising idealist, a scientist and poet combined.

And time and closer association served only to deepen and broaden this impression. It was this intangible but most real fire radiating from the man that impelled all of us to contribute our best gladly—all of us who were fortunate in being aides in the first expedition sent out for the furtherance of the great African Hall project.

Not only must the backgrounds be as correct, but they must be as typical of the continent as were the beasts they accompanied; in fauna and flora, in geology and geography, we must give as comprehensive a sense of the essence of Africa as was possible within our limitations. We must produce complete pictures, faultless history, perfect science.

The background to a group of animals calls for the utmost measure of truth; there is in it no place for individuality as expressed in treatment, or style, for it aims to suggest paint as little as do the mounted animals; but in subtlety of tone, color, and line, the massing of light and shade, the catching of character in forms, the rendering of textures, the achievement of the illusion of realism

and forgetfulness of paint, there exists a challenge; the mightiest wielders of the brush that walk may well take counsel with themselves ere taking up this dare, for Africa is diversified and vast and strenuous.

With a list of all the quadrupeds and a map of Africa, a selection was made of those creatures that could be accommodated in the Hall, and the landmarks which, coupled with them, would tell the biggest story—give the most vivid idea. These animals and landmarks are scattered over the whole continent and necessitate visits to some of the remotest parts.

Our first safari to the Lucania hills was during the rainy season; the Athi plains were green and meadow-like, and the brilliantly colored rock-lichens had dressed the kopjes in their most effective liveries. These rocks were a revelation to Mr. Jansson and myself, and we were lured into making a number of separate studies of them, besides our studies for the Klipspringer Group. Jansson especially, produced some remarkably handsome and artistic studies of the beautiful rock masses.

The play of cloud-shadows over the plains was another delight; infinitely delicate patterns of pearl and lilac with old-gold spaces of dewy light between, and the tree-fringed Athi zig-zagging away into the hazy immensity whence rose, as though pillowed on clouds, the lordly glacier-capped peaks of Kenya directly under the equator. It was a spot that might have been selected for the special observation of the endless pageantry of the skies; the inimitable storm effects with wild rags

and tatters of torn clouds hurrying panic-stricken before black rolling masses that emitted quivering forks of flame, and direful groans, and long descending sheets and columns of rain, sometimes purple and green, sometimes illuminated, amber and iridescent-rose-pink; sometimes oblique straight lines, sometimes twisted and contorted. And the never-to-be forgotten grandeur of the sunsets, the supernal glory of the sunrises! Truly Lucania was a place to dream of.

Sometimes it is not possible to find all the elements necessary for the painting of a background in one place. The Buffalo Group was one of these. The right view of Mount Kenya and of the great swamp in which the beasts hide, as well as the lava-rock foreground, we found together, but the wall of vegetation necessary to give a true idea of the haunt of the buffalo had to be obtained from a different part of the morass; and even here the characteristic alleys and tunnels were lacking.

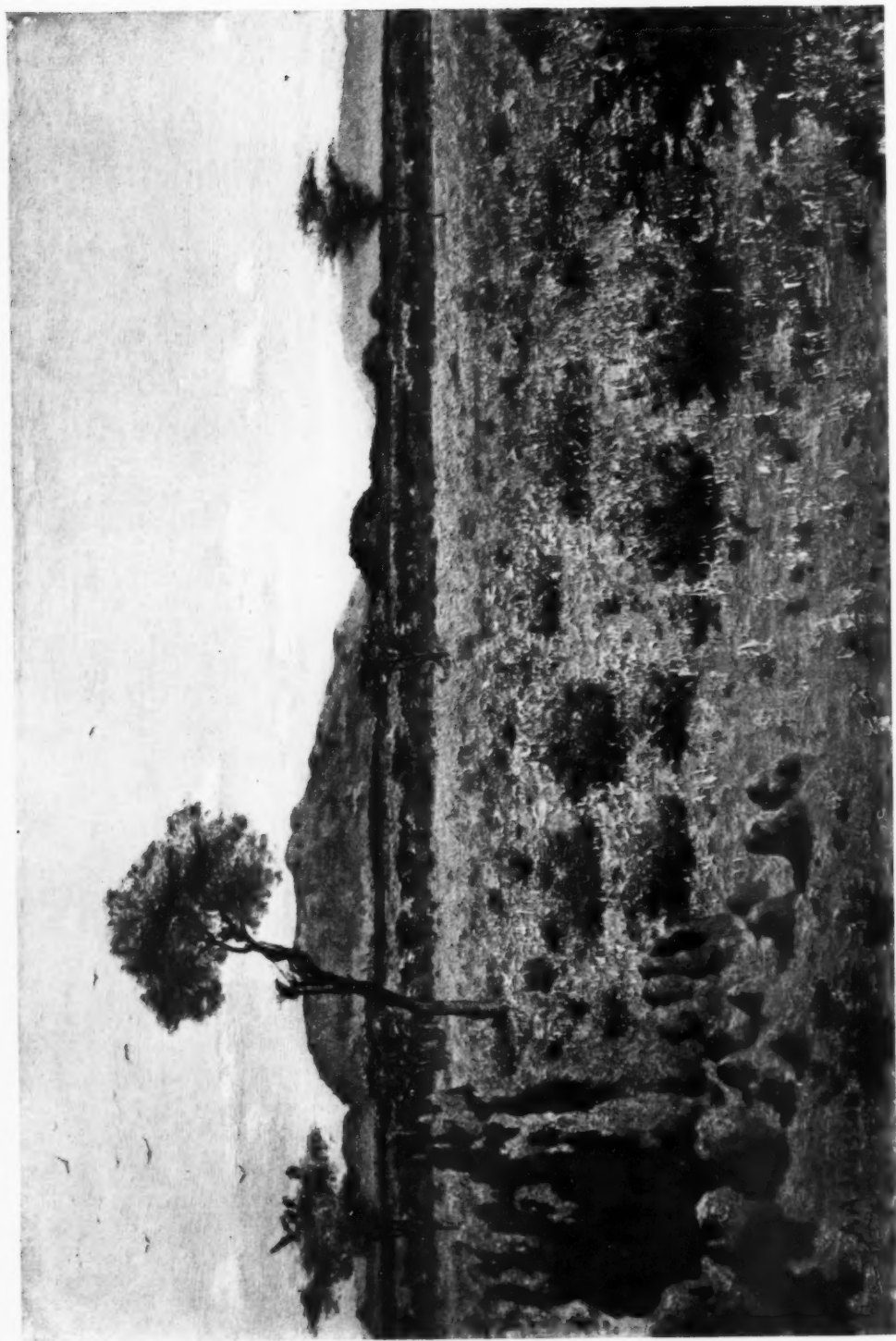
To gain adequate knowledge of these, I ventured one day, after considerable hesitation—for the buffalo is the most dangerous animal extant—into the beast's domain. With my gun bearer proceeding cautiously and silently for some distance, I came suddenly into a large amphitheater-like space where the rank vegetation had been completely trampled down, and in the center lay the skeleton of a cow buffalo, recently picked clean by the hyenas. All around, the high walls, pierced in two places by tunnels, formed entirely impossible barriers to the passage of men—save at a very slow pace—while underfoot the black gumbo gave way constantly, so that leaping from one precarious grass hummock to another alone kept one out of the turbid water.

An occasional slip and splash was disconcerting to men who dared not breathe aloud, but when several wild fowls, without warning, started up with a whirl of wings and wild cries, we halted. Dead silence reigned after the noise of the birds subsided, and I noted the things I had come for, with keen attention, but when my native touched my elbow and whispered that he believed he had heard the grunt of a buffalo, I decided to retrace my steps. Had there been buffalo near enough to have gotten our scent, it is easy to imagine what might have happened; yet without the hazard how could the information I needed have been obtained?

Sudden departures on long and arduous trips necessitated the construction of special boxes to protect studies from dust and careless handling; also against rain, and insects, and lizards that may crawl over them during the night, especially while the paint is wet. These boxes must be entrusted to carriers who will not fall down in the middle of rivers, or bump them violently against rocks and trees.

Making the Plains Group background was fun; a three-mile drive every morning and afternoon with an auto-truck, amid vast numbers of gnu, topi, zebra, Grant's and Thompson's gazelles, impala, kongoni, wart-hogs, and occasional bands of ostriches, oryx, and giraffe, with now and then a bunch of hyenas, a stray jackal or fox, even a lion or two—a drive to a pleasant hillside, where I sat in the truck overlooking the enormous game-dotted stretches, and in perfect weather painted Tanganyika. Wild dogs on the hills above me barked; secretary birds stalked by, and bustards paused and surveyed me curiously. I had time to paint storm effects, and moonrises, and





COLOR STUDY FOR THE WATER HOLE GROUP

Painted in the field by Arthur A. Jansson, while on the Eastman-Pomeroy-Akeley East African Expedition, 1926-27

intimate studies of grass-stretches and trees and kopjes; and there were no mosquitoes, no ticks; there was a nice, comfortable roaring of lions each night, an occasional stampede of game through camp that did no harm, and endless howling of hyenas, of course. It was a picnic.

In cases like the Gorilla Group, which necessitated a tramp of 125 miles—each way—and a climb to 12,500 feet altitude, the studies would all have been ruined but for extraordinary precautions. As it was, the dampness of the mountains made the canvases so loose and flabby that work on them was difficult.

The trail—we had to chop most of it out as we went—was through dense jungle the whole way up the mountains. The jungle was the natural habitat of elephants, buffaloes, leopards, and gorillas. We stampeded a herd of buffaloes on the way up, and saw many very fresh tracks of pachyderms, but though we would have been almost completely at the mercy of the beasts in case of a charge, nothing untoward occurred.

On this expedition our leader succumbed. The shock added to the natural difficulties of the place, staggered us all for a time. The responsibility of finding the point from which to paint became mine solely.

With the help of a native who, having been Mr. Akeley's former guide, knew the spot desired, I started out in bright sunshine to find the place, but we were soon enveloped in fog and floundered about in the dripping jungle all day, unable to tell whether we had found the place or not, hoping against hope, only to be driven back to camp by a deluge of rain and sleet.

On the following day we were more fortunate. Slipping and sliding up

steep inclines, along buffalo trails, wading neck-high through dense masses of wild celery, stumbling over concealed logs, steaming with perspiration despite the cold, and gasping for breath, we found the exact spot, commanding a grand view of the two active volcanoes, Chaninagongo and Namagira. We had been at the exact point the day before.

I established a camp on the following day, after leveling sufficient space by excavating back into the bank. It placed me five hundred feet above the base camp and necessitated a stay of more than three weeks, during which food and water had to be brought up to me daily. Work had to be done during such intervals as clouds and rain permitted. I painted from the open end of a big fly, which could not be prevented from flopping when the wind blew and jarring the canvas incessantly. I worked most of the time with a charcoal stove beside me, or between my feet, and clumsy with all the clothes I had heaped on me. The nights were made weird by the sullen glow of Namagira's raging furnace, and by the unearthly cries of the tree hyrax, and the occasional rasping note of leopards. The tracks of the latter were found around camp every morning; also during the day family rows among the gorillas set the jungles echoing.

I determined not to miss the opportunity to get a study of the peak of Mount Mikeno—although it had nothing to do directly with the group; yet the red glow of the declining sun made a thing too marvelous to be resisted. It was a case of painting furiously upon those rare occasions when that phase of the peak could be seen. Often a sudden shower necessitated a hasty retreat to camp, for to

get what I wanted I was obliged to go fifty yards off to one side.

It was also incumbent upon me to make a great number of studies of plants with their flowers and berries.

On our journeys back and forth from the Congo, we had to travel many miles through the bamboo belt. This is a strip approximately two miles wide on steep ascents, which is determined by altitude, above and below which no bamboo grows. The bamboo is a favorite haunt of the elephant.

The tract we traversed was composed of a wilderness of precipitous, winding and narrow-crested ridges, between which ancient lakes had become so filled with decayed vegetation that they were now reed-grown bogs, narrow, level, and stretching willow-green, like vast sleeping serpents, for miles between the darker green of the bamboo. The trail followed the line where the bamboo and the swamp met; an impenetrable jungle on one side, and an impassable swamp on the other. The jungle was smashed and battered in places, the morass criss-crossed by trails, and the path full of huge, deep tracks—the work of elephants. In case of a charge by a pachyderm there was no refuge, no escape save in the possession of good nerves and a heavy rifle.

During our return trip through this country, we were startled one day by a native staggering out of the bamboo into our midst. He was covered with dirt and blood. The man, with a companion, had been chopping bamboo a few moments before when an elephant had charged down on them. The companion was killed. On the same day reports reached us that two men had been killed that day on the trail which we would traverse the next day.

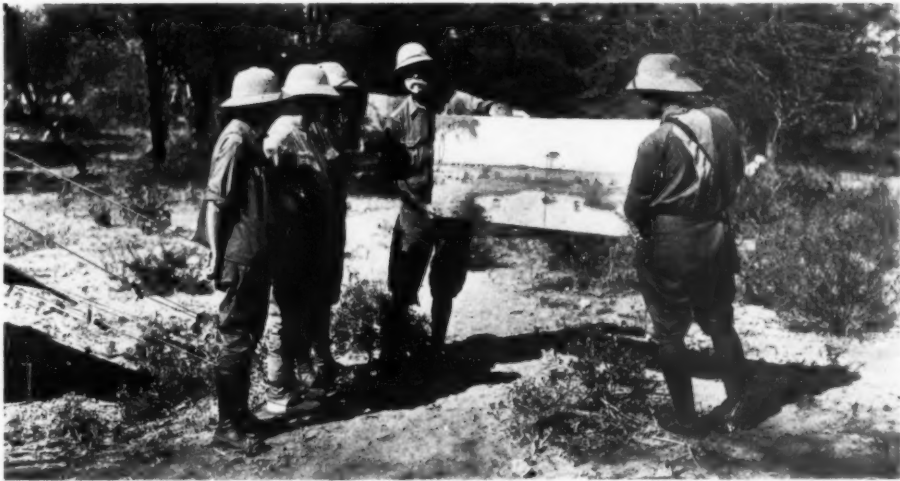
The following morning our two hundred porters got under way as

soon as their loads were ready for them, as was their custom. I was in the lead of the rest of the party following them. I had proceeded some four miles when wild cries of terror ahead alarmed me. I hurried forward but, by the time I got around the bend that shut off my view, the elephants sighted had been frightened off by the uproar. Shortly afterward I passed what the cheetahs had left of the bodies of the luckless victims of the day before.

On our last safari to Lake Hannington difficulties equally great but of a largely different character were encountered. The region is a dreary desert tract, thinly scattered with native goat herders, and rarely visited by whites. It is composed of lava beds sparsely covered with stunted acacia and thorn bushes, and innocent of roads. At the time of our visit, it was also devoid of water, save the lake and its contiguous warm, hot, and boiling alkaline springs.

It was a fifteen-mile tramp from the end of the road, where the automobiles had to be abandoned, to the part of the lake for which we were bound, but through misinformation we walked twenty miles to the wrong end of the lake and were obliged to journey the same distance back along its shores to the right end. Though this consumed three days, it resulted in our seeing the vast aggregations of flamingoes that did not congregate in anything like such numbers at the end for which we were bound.

On arrival at our base camp it became my duty to ascend the eighteen-hundred-foot escarpment, and find a site from which to paint the background for the Greater Koodoo Group; as far as could be seen the escarpment was a pathless rampart, covered with a vast variety of bushes and cacti—everyone



Daniel Pomeroy, George Eastman, and Doctor Stewart inspecting paintings made by Mr. Leigh and Mr. Jansson for the water-hole groups

ingeniously armed with most vicious thorns—rocks, grass, and briars, and was exceedingly steep, where passable at all, while most of it consisted of sheer cliffs.

We had with us a native guide who professed to be familiar with the country. I inquired of him if there was a trail leading to the top; experience and common sense told me there must be,—I reasoned that the herds on the top would probably have to descend for water—but our guide said “No”; there was “no trail.”

When all that was required for the establishment of a new camp was loaded on ten porters, this worthy undertook, the second noon, to pilot us up to the top. It looked a formidable task and for the porters proved an impossible one. Half way up the precipitous slopes, the treacherous footing and the thorns and rocks brought us to a standstill, with a band of baboons above us cursing and deriding us with furious ardor. The porters were strung out in a crooked line, clinging desperately with their feet to the

precarious shelves, bleeding from scratches, panting, perspiring; the heat was frightful.

I scanned the slopes from the vantage point gained, and discovered a yellow streak half a mile distant, leading up a promising shoulder. I pointed it out to the guide. He laughed.

“It does not go the whole way up.”

That didn't sound logical to me. I commanded a halt and rest, while I investigated. I satisfied myself that the trail did lead to the top and by sundown I had the whole party on a small level two-thirds of the way up. We made camp.

The following morning I took Tomasi, my best man, and started for the top. I carried the gun and he the canteen and lunch.

The top of the escarpment gained, a wide broken country spread out before us, in which the vegetation gave no hope of water within range of the eye.

Following the jagged edge of the cliff-system for two miles, over parched and pathless wastes of lava-strewn ravines and hog-backs—a wilderness

of thorn and bramble amid which baboons and impala scampered from sight—I came about noon to the place where I decided my camp would be. It commanded a magnificent view of the lake and the two walls of the Rift Valley. Yet to make sure that I had really found the best point, I explored several miles farther, without changing my mind.

By the evening of the next day I was established in my new camp and had begun work. The wind proved a troublesome factor, keeping in a perpetual state of agitation the fly which protected me from the fierce rays of the sun. Water had to be brought up every second day—water that had alkali in it—and the heat made provisions spoil readily; an attack of fever put me in bad shape for a week.

Every night the wind rose and the dried leaves and thorny twigs of the tree above my tent scratched and scraped the heaving canvas, while hyenas wailed and laughed, and endless flocks of flamingoes honked overhead. As in the Congo, I had to do a large number of plant studies in addition to painting the view. The wind blew sand and litter over the wet paint and sawed the ropes of the fly in two against the rocks. Yet it was a fascinating camp—so deserted—so savage; the baboons came every day to denounce me; a big old male would perch upon a high rock, or in the crotch of a tree, and abuse me by the hour. Hyrax expostulated in no uncertain tones, and big crows balanced on snags to squawk intermittently. And the sunrises and sunsets! The great valley then lay in delicate lilac shadow, while the tops of

the escarpment walls caught the first or the last rose-rays of the ascending or declining orb. And when the opal-tinted misty lake lay smooth in moonlight and down the starred expanse above a meteor plunged, there remained no doubt that it was a glorious camp.

Tomasi's feet got so full of thorns that I had to dress them with disinfectant and adhesive plaster and contribute a couple of pairs of socks and a pair of shoes. Tomasi never swore, never stole, yet he was an impregnable atheist.

In painting studies for backgrounds it is necessary to keep in mind that the ultimate picture will be painted on a half-circular canvas; also that a plastic foreground must be joined up with the picture. Some joinings are more convincing than others, and the sense of distance, aerial perspective, the impression of looking downhill, the management of shadows and lights, must all be thought of while selecting the motive.

The shipment of painted studies is a detail also not to be neglected. All rolling or bending is bad. Mr. Radatz constructed a metal case with handles, into which all the larger studies, after removal from the stretchers, were packed with oiled paper between each two, so that lying flat and sealed against dampness, they traveled safely in the hands of the aforesaid gentleman across the ocean and into the Museum. In like manner the panel studies and sketch books were separately and specially packed by him, with the result that all have reached their destination in perfect condition.

Collecting Large Mammals for Museum Exhibition

By ROBERT H. ROCKWELL

The visitor standing before a museum group can have little conception of the enormous task which confronts the preparators when planning and constructing such an exhibit. The days of tracking on the field with unlimited patience, the knowledge of what to select, the long hours of arduous toil, often from early dawn till far into the night and under the most trying conditions, to preserve the specimens and make accurate measurements and color studies as a guide for the future work in the laboratory, and then the final assembling of all the parts into a harmonious whole,—all this is a story unknown to the world, but one without which the groups would not be possible.—THE EDITORS

A RARE opportunity was in store for me when the late Carl Akeley proposed that I join his expedition in Africa and assist him in collecting specimens and data for a series of six animal groups for the African Hall. I was glad to avail myself of this offer, for Akeley was without doubt the greatest mammal taxidermist in America if not in the world. Many of his methods were distinctly original, and he knew Africa and its wild life as few people do. Besides this, he possessed that indefinable quality of character that endeared him to all those who came under his influence either in the field or in camp.

Akeley's plans called for a hundred specimens of mammal skins, not to be gathered in a haphazard way but to be selected carefully with reference to certain groups that were considered the most typical of Equatorial Africa. Prominent among these were the giraffe, buffalo, oryx, impala, zebra, hartebeest, and gazelle.

Few expeditions have entered Africa with the definite purpose of collecting material and accessories for habitat groups. The quest has usually been for a large series of study skins, specimens that seldom receive the care or handling to make perfect mounts or to meet the high quality of museum taxidermy.

Akeley's methods of field work were painstaking and thorough, and aside from preserving a perfect skin, it included precise anatomical measurements and a great amount of two-handed work.

In the old days of "stuffing" skins, anyone with a hobby for collecting could go out into the wilds, secure a pile of skins, and then present them to a museum without measurements, bones, or other anatomical information. Indeed, the taxidermist was expected in many cases to resurrect beasts that he had never before laid eyes on. Fortunately this mode of procedure is passing, although even now a few of these terrible examples still stare accusingly at us from museum cases.

Collecting museum specimens is no light undertaking, especially when the animals are to be mounted. Merely recording a few measurements of a beast, flaying the carcass, and scattering some salt on the pelt is not going to insure fine results or well mounted specimens. From the time an animal is selected from a herd by the shot that brings him to earth, one must constantly bear in mind that his carcass should be regarded with due respect and every consideration given to "immortalize" that form by all the means that art and scientific skill can command.

Selecting the proper specimens for a group demands care and judgment. Only a small percentage of animals seen or stalked are fit subjects for mounting. Some of them present abnormal defects or are badly used up from fighting or old age. In such cases no amount of taxidermic skill will avail. The production of a flawless manikin, with every muscle and line a masterpiece of modeling cannot offset inherent defects in a skin and the results can be nothing but mediocre. An animal skin for mounting must be perfect at the start, cured properly, and kept perfect until it is placed

on the manikin and put in a glass case. It was for such reasons that Akeley always objected to mounting anything that he had not seen or studied himself. His excellent animal groups in the Chicago Field Museum indicate that in this attitude he was thoroughly justified.

Our African collecting began at a place called Lucania, forty miles from Nairobi. The klipspringer was the first object of our efforts. As it was a thin-skinned animal, it was preserved by a different method than the larger and more massive beasts. No salt preservative or curing formula was used on these small pelts. The climate being dry and warm, the skins were turned inside out, exposing the entire fleshy surface to the air. They were protected by canvas from the hot rays of the sun,

and within ten hours were quite dry. It was an excellent system but it required expert care and attention. The climate has to be such that the skins become dry before decay has a chance to set in. However, specimens preserved by this means are subject to the ravages of insect pests. To guard against this risk, the hides are taken when bone dry and placed in zinc-lined cases which are soldered up so as to be air-tight. Then, through a round hole in the cover (which is later capped with a screw-top plug) disulphide of carbon is poured in. This is a poison that destroys all injurious insect life

but is not detrimental to the skins. It is a volatile gas, however, and the soldering must be done before the liquid is poured in, otherwise a dangerous explosion is liable to occur.

Of the larger animals that we collected, the buffalo and the giraffe presented more varied problems. They required much labor and a certain degree of skillful handling after they were brought down.

Selecting a typical specimen from a herd often demanded days of tracking and unlimited patience, especially with the buffaloes which are always keenly alert and suspicious. At times they are dangerous and one must always approach them with the utmost caution. When a herd becomes alarmed, the animals will mill together like a lot of wild cattle in a stampede, and it is

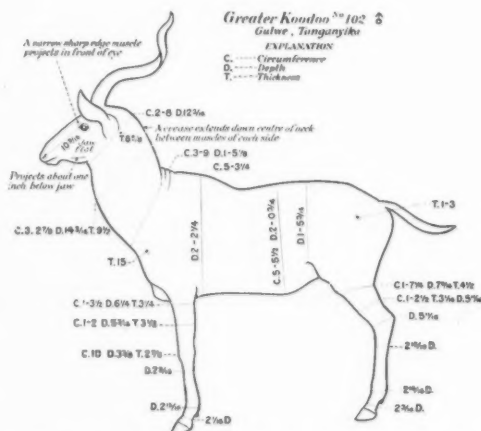


Chart for measuring large mammals. After Akeley

then almost impossible to pick or choose a desirable specimen.

Two buffaloes had been secured by Mr. George Eastman for the group, but we still required several more specimens to complete our collection. A large herd was known to frequent a region thirty miles below Fort Hall, so, in the latter part of July, 1926, Akeley sent me down the Tana River to obtain the needed animals. This gave me an unusual opportunity to collect and study these interesting beasts in their natural environment. With a motor truck to carry my camping outfit and supplies, and sufficient provisions to last for two weeks, I headed overland through a trackless open country into the valley of the Tana, accompanied by five black assistants.

After hunting for five days we located the tracks of the herd. It was six o'clock in the morning when we found the trail at a series of water holes where the animals had evidently spent most of the night. We followed their well marked meandering trail over high hills and through open grassy country until noon. Then, in a thicket of dense bush, I saw a pair of flapping ears near the ground not more than ten yards in front of me. It was a buffalo lying down and watching us as we were working out the tracks. Presently there was a wild stampede, and buffalo just boiled out of the bushes, crashing down trees in their hasty retreat. There was too much confusion even to see what type of buffalo was dodging about, and they were gone out of sight in a moment. But we noted the general direction they took. At five o'clock that afternoon we caught up with them again and I secured a fine old cow and a calf which were very desirable specimens for the group.

After taking a few photographs in the fading light, I made about a hundred measurements of the two animals and a chart of accurate anatomical notes. We were now seven miles from camp, with darkness rapidly closing in on us, but it was absolutely necessary that the skins of these animals should be removed from the carcass at once so we decided to stay out for the night.

We had no lamps and there was no moonlight, but by gathering up what wood we could find we built a fire, and three natives held fagots over me while I did the skinning and dissecting. All the specimens were eased skins, and this made our work much harder. No opening cut was made on the legs except a six-inch slit from the dew claws to the hoofs. But a long incision was made along the belly and through this I had to grope in the darkness to cut the joints where the legs joined the body. The legs were then skinned out hollow and were peeled down much as one pulls off a stocking. It made a perfect job but it was heavy work at the end of a hard day's hunting, with no meals to speak of and a woeful lack of water. At midnight the work was far enough advanced so that I could rest a bit. I selected a tender piece of buffalo meat and broiled it on a stick over a red-hot charcoal fire, thus breaking an eighteen-hour fast.

There was no chance of sleep here, for it rained all night, and at the first faint signs of dawn I made haste to reach camp and secure the salt so vital to preserving the skins. If I could only get salt on those hides before the sun came up the situation would be saved; if I failed the skins would rot in a few hours and all my work would have been for naught. It was a long journey back to camp, and for the first four miles I ran for a good part of the



Drying the giraffe skin in the shade of a giant Acacia tree

way, but the lack of food and sleep began to tell, and the high matted grass seemed to trip me at every step. I had two porters with me, and as we crossed the slope of a low hill, I was so tired I gave one of the men my gun to carry. It was the first time I had ever allowed a native to carry my gun and it taught me a lesson. At that moment eight splendid buffaloes with enormous horns appeared, heading in our direction; we could just see their heads over the top of some tall grass. My first thought was of the possibility of a charge. Just then I saw that my porter had sized up the serious situation and was starting to bolt with the gun that was our only protection. There were no trees or rocks behind which we could dodge, for we were in com-

paratively open country, and the buffaloes came closer, spread out in company formation, and stood about forty yards away gazing at us in a menacing manner. At a command from me in no uncertain tones that native sneaked back with my rifle. I already had two buffalo skins not yet cared for, so I had to forego a splendid chance to secure a fine bull and I let the herd pass on without firing a shot.

On reaching camp I had a belated breakfast and with the motor truck worked my way among the hills where I had left my gun bearer guarding the two skins. By nine o'clock the two skins were thoroughly salted and saved. We took them back to camp with the complete skeletons of each. The flesh was all cut from the bone

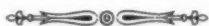
and the entire skeletons were preserved in ligamentary form as a guide in mounting later on. Then with the aid of two black helpers I shaved the hides down on the flesh side, taking off about a quarter of an inch of flesh and leather. It was a tedious operation requiring two days of steady work. The specimens were then suspended from a tree in the shade where they became perfectly dry within a few days.

The motor cars were invaluable to us in many ways, for we were enabled to carry with us a very complete outfit and a supply of salt that was most essential for our purposes. Indeed, it would have been well nigh impossible to accomplish the results that we obtained by using native carriers. Plaster of Paris was used to a great extent in making casts of the anatomy and death masks of the animals' faces. Some of the skeletons and skins were transported by motor truck for more than five hundred miles.

Collecting specimens of the giraffe was greatly facilitated by having everything we needed at hand in the car. Perhaps the most useful article was the large canvas tarpaulin that we raised over the beast after he was shot. While we worked it protected us from the burning heat of the tropical sun. If an animal is allowed to remain even three hours in the hot sun, decay is certain to set in and ruin the specimen.

Dry salt was applied to the inside of the skin and a liquid salt solution to the hair side. Within ten hours the beast was entirely skinned, salted, and the skeleton cleaned, but it required three days to pare down the hard, fleshy hide. Skinning out the long legs without cutting them open was a most difficult operation. A three-foot piece of flat hoop iron with a sharp edge was shoved up and down under the skin of the legs, releasing the membrane that held the skin to the bone; then the legs slipped out easily. The advantage of this method lies in the fact that in the final mounting there will be no ugly stitching or seams showing on the mounted specimen.

As material for groups of mounted mammals, the collection represents perhaps the best and most carefully handled that was ever brought back from Africa for this purpose. The most vital part of the whole plan, however, was the good judgment of Carl Akeley when he decided to take with him the artists who were actually going to mount the animals, paint the backgrounds, and reproduce the natural setting for the groups. This personal contact with Africa and its wild life was in itself an inspiration that will survive. It will produce a more definite plan of artistic endeavor and strengthen our efforts to infuse into the African Hall an element of realism and truth.





Model of the Giant Sable Group for the American Museum, prepared by John W. Hope under the direction of James L. Clark, assistant director. Photographic studies for the foreground and background were made by Mr. Vernay

Angola as a Game Country¹

By ARTHUR S. VERNAY

THE Portuguese colony of Angola on the West Coast of Africa is a game country, although it is known to the generality of sportsmen and collectors chiefly as the home of the giant sable antelope. One hears little of the variety and quality of Angolan wild life because British East Africa and Tanganyika, where game is so abundant, are much more accessible and the path of the hunter there is smoothed by numerous organizations that arrange for his comfort. Angola, where there is neither safariland nor professional hunter, has been penetrated by comparatively few sportsmen and consequently offers fascinating sport.

From a zoölogical standpoint, Angola is famous for the giant sable, although

the area in which this species roams is astonishingly limited. But those sportsmen who have not visited Angola may be assured that the giant sable is by no means the sole interest that this country holds from the standpoint of game. Large herds of elephants range along the Cunene River—the most beautiful district of Angola; there are lions west of the Cunene; the hippopotamus lives in large herds by the great rivers, and there are many antelope, including the greater koodoo.

There are not found in Angola, of course, the large herds of game that one observes on the eastern side of Africa. And it is interesting to note that the elephant, although of the same size, carries smaller ivory. The heads of the various antelope, espe-

¹The objective of the Vernay-Angola Expedition was to obtain a complete habitat group of the giant sable, comprising male, female, and young, for the American Museum. The expedition was surprised, however, on visiting various parts of the region, to see the abundance of game actually existent in Angola.

cially the greater koodoo, are invariably smaller than those in East Africa, with one exception: the giant sable carries a considerably larger head than the ordinary sable.

Specimens obtained included elephant, lion, Hartmann's and Chapman's zebras; roan, giant sable, klipspringer, stembok, springbuck, brindled gnu, eland, greater koodoo, water buck, reedbuck, duiker and blue duiker.

We saw hippopotamus, wart hog, oryx, leopard, hyena (which is somewhat rare in Angola) and bush buck, and found tracks of buffalo, but saw none. It is said that the gorilla also lives in this region but we did not find any, although we obtained a large number of lemurs and baboons.

Besides this game, our material for the American Museum of Natural History ranged from ants to elephants. I mention these extremes because we

secured a large collection of the former and a splendid specimen of the latter. Our specimens of mammals, large and small, reptiles, birds, and fish, numbered approximately 8000, and then there were the insects, butterflies, and fossils of which we had gathered a large number. Among the reptiles was an important group of snakes and geckos, chameleons and other lizards.

The more interesting game, I should add, must be hunted very seriously, as it is not as plentiful in certain parts of Angola as it should be due to lax supervision of the game laws. Not only the natives, who have lain in wait at water holes with bow and arrow, but the Boers, who went to Angola forty years ago, trekking up from South Africa, have pretty well shot out the country. The Boer is invariably an expert tracker and a very fine shot, and, I am sorry to say, merciless in his quest, as he kills to obtain skins after



Transportation has its difficulties in the wilds of Angola

his requirements for meat are filled. In certain sections of Angola colonized by the Boer, game is practically extinct.

There is, however, a district left around the Cunene River that offers great possibilities. From a place called Capalonga down to the mouth of the Cunene River, a distance of, roughly, 200 miles, one finds a virtually undisturbed country where game abounds. We had gone but one hundred kilometers from Capalonga when we came upon great herds of gnu that were almost tame. It was not until I had shot three for our collection that the great plain became entirely empty of these and other animals.

Those who have shot in Africa and realize the difficulty of getting in touch with the greater koodoo will appreciate the advantages of this region. Going along the banks of the Cunene one morning about eleven o'clock, I was amazed as we rounded a bend to come upon two greater koodoos basking in the sun. I am also told that a rare type of giraffe inhabits the savannah country near the mouth of the river. It is designated as the *Giraffa camelopardalis angolensis*, and is very much the same as the reticulated giraffe, except that the Angolan species has closer reticulations.

Birds are plentiful in this district. We saw a number of ostriches which were not so tame as those in East Africa and which never permitted us to come closer than 400 or 500 yards. There were also the greater and lesser bustards, several species of storks, marabou, and various cranes and many birds of prey. The sangras, or dwarf goose, a most interesting bird, was obtained along the Cunene.

So well worth while did we find this region along the Cunene that it is my intention to return and make the trip

down the two hundred miles of game country between Capalonga and the savannah country.

From this summary of the game found on the expedition it may be seen that Angola holds attractions both for the sportsman and the scientist. With the completion, however, of the Benguela-Katanga Railroad, linking up Benguela with the great copper mines in Katanga and the Belgian Congo, game in this region will naturally become more and more scarce. This will be particularly true of the giant sable which even now has become so scarce that it is closed to shooting.

My interest in this species was aroused first by the fact that, prior to our expedition, I had seen only one mounted specimen of the giant sable—this being in the British Museum (South Kensington). Prof. Henry Fairfield Osborn was consulted and he urged the immediate acquisition of a complete group of the giant sable for the American Museum of Natural History. The result of our conference was that Herbert Lang, assistant curator of mammalogy in the Museum, joined the expedition, and Rudyerd Boulton of the Museum's bird department was appointed ornithologist. For this assistance I am forever grateful to Professor Osborn, as I have never been in the field with two more enthusiastic collectors and keen and interesting companions.

Many months were required to perfect our arrangements, the most important matter being to obtain the coöperation of the Portuguese government. This, after a few interchanges between Washington and Lisbon, was most readily given; consequently the governors of the different districts through which we passed did every-

thing possible to facilitate our movements. Without this help the success which came to the expedition would never have been achieved. Mr. Lang, who is a veteran explorer, having spent six years in the Belgian Congo, did most of the work of preparation.

After a delightful stop in Lisbon we set out on a very comfortable boat of the German Oest Africa Line. The voyage of two weeks was broken by a visit at Teneriffe, followed by arrival at Loanda, capital of Angola. We then sailed for Lobito, which has one of the finest natural harbors in the world, protected by a long sand-spit extending far into the sea and making it possible for vessels to come quite close to the mainland in deep water.

On arriving at Lobito, I stayed for a few days with H. F. Varian, chief engineer of the Benguela-Katanga Railroad. From Mr. Varian, discoverer in 1913 of the giant sable which in his honor bears the designation *Hippotragus niger varianii*, I learned much that proved invaluable in obtaining the Museum specimens. Without his aid I am sure that the difficulties of our expedition would have been increased enormously. I would advise no one to undertake a hunting trip in Angola without first making the requisite arrangements with the Portuguese government and with some one resident in Angola.

It is an interesting experience to have to make one's own arrangements. In India they have an extraordinarily expressive term for this business; all the infinite preparations for an expedition, or for that matter any other arrangements, are called simply "bundabust." With no organizations nor professional hunters such as one finds in Nairobi, we had to make our own "bundabust." We assembled roughly

four tons of supplies and equipment—much of which we had brought with us on the boat—and hired the native personnel. There were, besides the carriers, twenty-five camp boys, skinners, and men, who were soon taught to help in securing small creatures and properly preserving them.



Steinbuck, one of the smallest of the true antelopes

We were singularly fortunate in enlisting the services of Alan and Harry Chapman, who were born in Angola and consequently spoke not only Portuguese and Boer but also two or three of the many native tongues. The help of these men proved invaluable; they were able in the field and most agreeable companions in camp.

From Lobito we traveled by rail to Benguela, whence the railroad ascends to about 5000 feet, going due east to Huambo, a distance of about 250 miles. Here we established our base.

The best season for the giant sable is in September and October, particularly the latter six weeks, when the rainfall has begun and the new grass is

coming up in the burnt stubble. As the grass had not yet been burned off, we turned southward toward Mossamedes for a series of springbuck.

Our route to Mossamedes lay through an arid country. All water had to be carried along in barrels, as the nearest supply was forty miles away. In this region we found only the springbuck, the desert fox, and, when nearer water, the oryx and Hartmann's zebra.

The first 275 miles of our journey to a place called Lubango was covered in Ford cars, which proved very useful. After a hundred miles we were in touch with game and saw roan, duiker, and various small antelope.

More interesting, however, were the tribes of natives encountered along the way, the Mondombos, Gambos and others, in the Province of Huilla. To obtain a photographic record of some of these was not easy. The hairdress of the women was most curious, being achieved by the use of red clay studded with shells, and their clever work in weaving sturdy baskets particularly attracted us.

After obtaining the springbuck series in Mossamedes we hurried back to Huambo in order to enter the sable country. Two or three days were spent in re-arranging the equipment. Then it was decided that Boulton should go to the hills for special birds, Lang to another district for small mammals and reptiles, and Alan Chapman and I should seek the giant sable.

We traveled three hundred miles eastward to the Cuanza River, which we crossed in long native dugouts, and were presently within three days' march of the sable country. This area extends only approximately a hundred miles north and south by forty miles east and west, being a part of the

water shed of the Cuanza and Luando rivers. It is an inhospitable country, sparsely inhabited by a tribe known as the Luimbés, an inferior race physically and mentally. We hired a number of natives as carriers and found that they could pack only fifty pounds as contrasted with the sixty-pound load on the East Coast.

After three days' tramping through the bush we came upon a cluster of half a dozen native huts, and miserable hovels they were. The *sova*, or headman, told us their hunter—who is a mighty man among the natives—was away but would return soon. We decided to wait and rest.

Shortly we saw a fine-looking savage approaching. He was almost seven feet tall and, with his big bow and one large, carefully constructed and well balanced arrow, his native axe, and a sparse drapery of skins, he made a picturesque figure. Alan and I were duly impressed and decided to engage this mighty-looking savage whose name, we found, was Tarti.

Tarti said he had seen sable only a few days before and, from his account, their size exceeded one's dreams. We knew that Tarti was exaggerating, but nevertheless the next day we started on our quest. We hunted for three days but found no sign of sable and obtained only one fair specimen of roan. This was disappointing.

Tarti, we discovered, was unaccustomed to crawling through the burnt stubble in stalking and he usually spent hours in a tree or some concealed spot awaiting the approach of game. In this way he occasionally killed reed buck, duiker and, rarely, a roan or sable. He also had a pernicious habit, when stalking, of taking pungent snuff, so that we never knew when he might be seized by a fit of loud sneez-

ing at the most inopportune time, frightening any game within earshot. After learning Tarti's shortcomings as a hunter we used him only as a guide, in which capacity he was valuable, for all the natives knew him.

On entering a village, Tarti always received a vociferous welcome. Natives sprang up from around their fires and cried "*Ohosie! Ohosie! Ohosie!*" To which he replied with gravity, "*Ondombo.*" Alan told me that the native greeting meant "The lion," a tribute to Tarti's ability as a hunter, while his salutation was simply a recognition of their compliment. He said "Great," much as one would say "Yes, I *am* the great lion."

Disappointed in Tarti's territory, we moved on to the Tetie River, which flows into the Chisonque and thence to the Luando, a district that Mr. Varian had recommended. The Tetie was little more than a stream at this season and the water was unpleasant in color and taste, but after boiling it twice we were able to drink it.

Within four days' hunting on the Tetie, where we camped, we luckily obtained two cows, a small bull, and a calf of the giant sable species. We had only a glimpse, however, of our principal quarry, the bull giant sable, which we saw once at daybreak, about three hundred yards away. The light was too poor for an accurate shot and the animal would undoubtedly have fled the region had we missed. He was followed for a short distance but his tracks were soon lost in the hard, dry ground.

Time passed and we became anxious, as only four days remained in which to obtain the old bull which would complete our group. Consequently I sent Alan northward while I turned to the south so that we could cover as wide a

territory as possible in the limited time. We agreed that should either get the bull he would dispatch a runner to the other so that immediate preparations might be made to break camp.

I took with me a native of the Umbundu tribe, named Sakafuta, who had hunted with me for a considerable time. Sakafuta was keen and, although we could not speak to each other, he always seemed to understand what was required. We tried earnestly the next two days but had no sight of the bull giant sable.

It was necessary for us to leave camp on August 15 and on the evening of August 13 the group was still incomplete. No word had come from Alan. I returned to camp weary that evening, with Sakafuta on the point of giving out, as the burnt stubble had sorely tried his feet. It seemed as though we were to fail in obtaining the most wanted specimen for the Museum.

I informed the camp boys, through Mensa, our cook, an aged Sierra Leone negro who spoke English, that "tomorrow we pack up; no more hunting." Sakafuta was overjoyed, as his feet were bleeding, and the other boys began making preparations for the march.

After a hot bath, a good meal, and the wonderful quiet of the African evening, with time to think things over, aspects changed. "After all, the last day may be the best; the Museum's luck must hold." Mensa was called and told that I had changed my mind. Sakafuta and another must be ready at half past four next morning for a final attempt to get the old bull. I determined to make one more wide detour around the feeding ground where several days previously we had seen the bull sable.

Dawn was breaking as we set out at a quarter to five, at a brisk pace but with eyes and ears alert. It was about seven o'clock, the sun was well up, and we were moving noiselessly through grass to our waists; I was in the lead, the others following. Sakafuta and the other man, they afterward told Alan, were looking to the right when I saw on my left a black object moving in the grass.

A motion of the hand and the men slid silently into the grass and disappeared. Cautiously turning about, I saw a splendid bull giant sable antelope, with superb scimitar horns, boldly carried, walking parallel to us within a hundred and fifty yards, wholly unconscious of our presence. I shall never forget that sight.

He walked behind a huge fallen tree. Would he turn into the bush from behind the tree? If so, I must follow him, which would be a great risk, as with eyesight and hearing developed to an acute degree, he would have disappeared at the slightest sound. I could see his form dimly through the dead leaves. He kept straight on, reappeared, and the shot was taken. It was a little far back; he stumbled, and the next shot gave us the prize which completed the habitat group of giant sable.

We hastened over and carefully examined our trophy for the Museum. It was a fine old bull with horns measuring $54\frac{1}{2}$ inches almost perfect in symmetry and with large base measurement. He was just what we wanted—a representative example of the bull sable in perfect condition.

I had not brought a camera with me,

as all extra weight told heavily, so one man was sent back to camp to get it. Meanwhile, Sakafuta was beside himself with joy. He leapt up and down, beating his chest, patting the sable, slapping himself on the head, and continually mimicking the motions of the stalk. Apparently he was explaining to me how clever he and the other man were to have disappeared so quickly in the bush. Apart from his pride he knew that he had earned the reward of *escudos* that he had been promised in case we got the big bull, and which he certainly deserved.

Within four hours a small army of natives appeared, the sable was skinned and the skeleton carefully preserved. By eleven o'clock that night, our last before it was necessary to begin the return trip, the skin had been salted and packed and everything was in readiness for the move.

A runner was dispatched to Alan but could not find him, for he was hunting his territory thoroughly and moving camp day by day. Had I not been able to obtain the old bull, I had intended leaving Chapman in the field, as chances of success would have been better when the rains set in. However, he appeared next morning at nine o'clock, whereupon we immediately started back toward the Cuanza and home. Needless to say, we were delighted that the group was complete.

On the way back to our base at Huambo we met Lang, who had added a large number of specimens to the collection of small mammals and reptiles, and at Huambo we found Boulton who had had great luck with birds.

Natives of East Africa

FROM PEN AND INK STUDIES MADE IN KENYA COLONY DURING THE EASTMAN-POMEROY-AKELEY EAST AFRICAN EXPEDITION OF 1926-1927

By A. A. JANSSON



KIKIYU HOUSEWIFE

The Kikuyu housewife or "bibi" does all the heavy work, and if she has children they must help her at a very early age. The burden carrier shown suspended from a band around her forehead is often laden with from 60 to 100 pounds of wood, sugar cane, bananas, or maize, and a baby may also ride on its mother's hip at the same time.

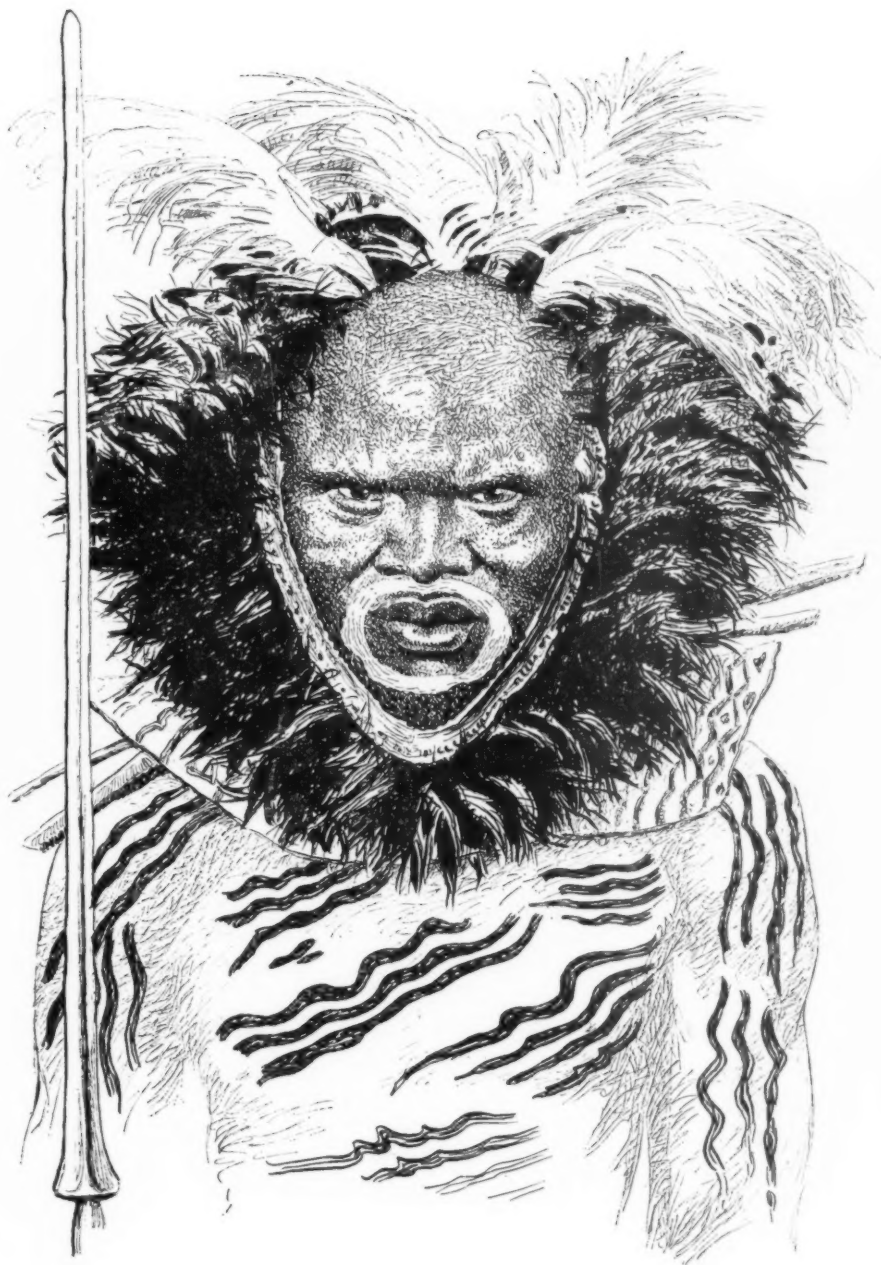
The Kikuyu woman's most conspicuous ornaments are ringlets of pink beads hung from her ears. The rings are about six inches in diameter, and twenty is not an unusual number for each ear.



MASAI WARRIOR

Proud, courageous, independent, the men of the Masai tribe are great warriors, and still carry on raids when opportunity presents itself. Their diet consists of raw and sun-dried meat, honey, milk, and blood obtained by bleeding their cattle. Few will serve the white man save as hunters or guides. They are very shrewd, taking nothing for granted, and always questioning anything said to them through an interpreter.

The Masai are very clever metal smiths, and are famous for their spears and shields as well as for the great variety of ornaments they design for the women of the Samburu and Masai tribes. The earrings shown in the picture are made of iron and copper and are worn only by the men.



ATTIRED FOR THE DANCE

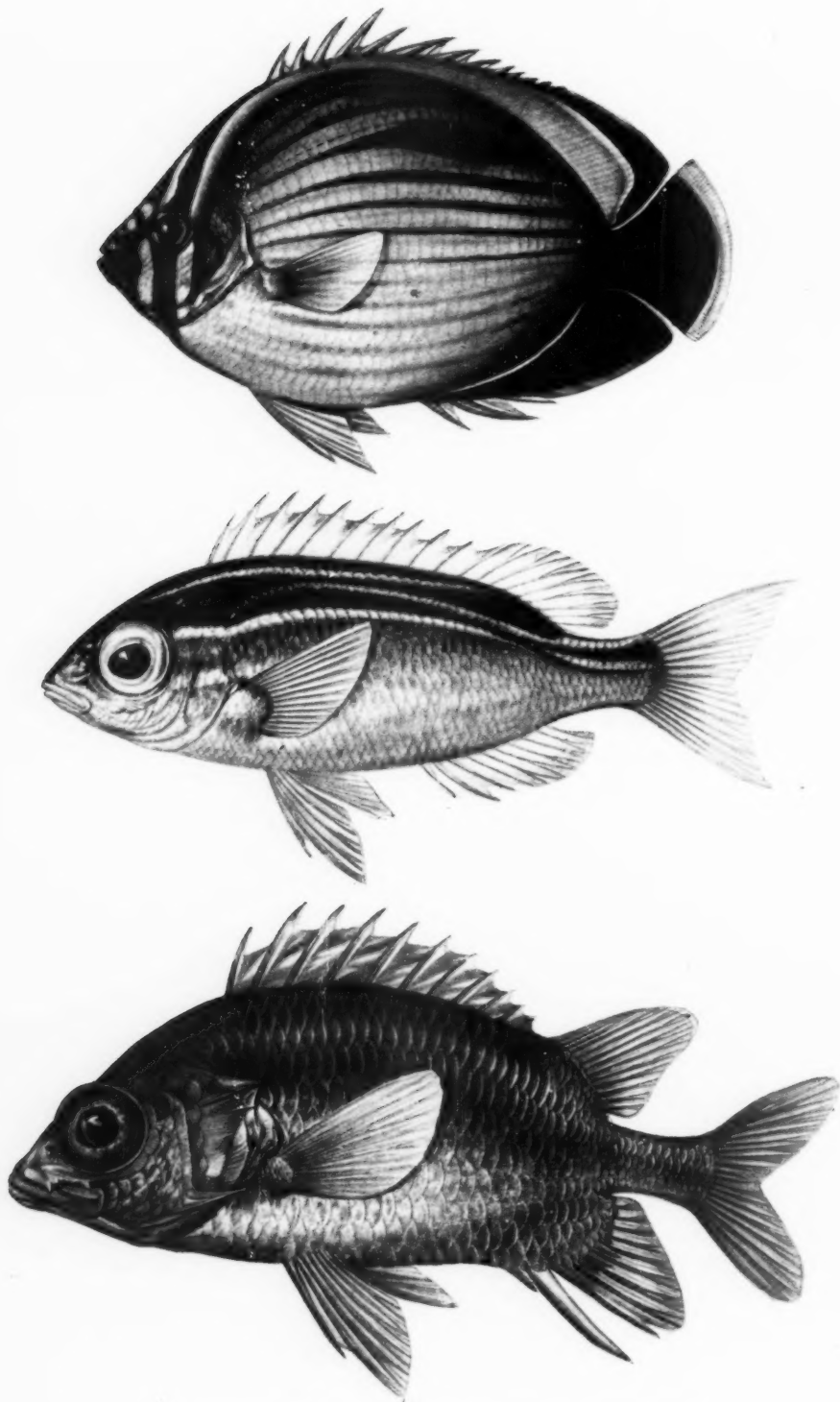
The "full-dress suit" of the Meru man includes a striking headdress of ostrich feathers. He paints his body white, then uses his finger nails or a twig to scratch off the paint, causing the brown skin to show through in stripes. One native painted his legs white from the feet to the knees. Above the knees were white rings, and the face was painted red with white rings around the eyes. Among other adornments seen were tails of vulture feathers, cardboards, pieces of tin and skins, and in one instance the stiff bosom from a white man's dress shirt was fastened on behind so that it dangled loosely when he danced.



SAMBURU MOTHER

The "m'toto" straddles his mother's hip and nestles his head between her shoulder blades when he wants to sleep. He is held in place by his mother's garment, a simple strip of unbleached muslin, which is allowed enough slack to accommodate the m'toto, and is fastened at her side.

Shredded palm leaves, wood, fish vertebrae, rawhide, and brass and copper wire are all pressed into service for necklaces. Brass wire about one quarter of an inch thick is wound closely around the arms and legs. Brass wire earrings of the design shown are original with the Masai, but are also used by the Samburus, who are a closely related tribe. A pair are sold for one sheep or goat by the Masai natives who make them.



FISH COLLECTED BY THE TAYLOR SUDAN EXPEDITION

Upon returning from the ibex hunt, and while awaiting the steamer for England, Mr. Taylor and Mr. Anthony made a large collection of the brilliant fish which teemed in the harbor of Port Sudan. The three shown here are, respectively: (top) *Chelodon vittatus* Bloch and Schneider; (center) *Scolopsis ghanam* (Forsk.); (bottom) *Holocentrus ruber* (Forsk.). See footnote, page 601

With the "Fuzzies" after Ibex¹

By H. E. ANTHONY

Curator, Mammals of the World, American Museum

A BLAZING sun had slowly crossed a sky of brass, and shadows were lengthening behind the rocky, heat-shimmering ridges when our two guides came up to the tent where we sat cooling off after our four o'clock tea, brought their heels together and saluted in military fashion. Where they learned how was a mystery, but at any rate the practice served to introduce a little snap into customs that are, for the most part, very casual.

"Do you want to hunt ibex tomorrow?" was the English equivalent of their question which reached us, partly in Arabic, with the aid of a third native, Ali Abdullah, the skinner. Osman, our official interpreter, was lying on his back in the cook tent, his leg swollen from the bite of some venomous creature, a scorpion perhaps, or possibly a snake, but we hoped for his sake it was not the latter. The night before, he had stepped on some unknown thing in the dark and now was beginning a two weeks' period of helplessness.

We wanted to hunt ibex, of course, that was what we had come for, and we soon learned that our guides knew where we could expect to see some. Our auxiliary forces, the "Fuzzies," had scouted over the hills and reported favorably. We would get up at three o'clock in the morning, the guides said. This aroused no wild enthusiasm, but if it was part of the game we would do it. After a few questions the conference came to an end and the guides went back to the native section of camp.

It seemed as though three o'clock came as soon as we had fallen asleep, and if the ibex chose such an hour to be on the move we thought less of this animal than ever. Our first suspicions as to the mental status of the ibex had been aroused upon our arrival in the Red Sea Hills, for a more desolate, rock-strewn and worthless waste it is difficult to imagine. If the ibex, like our Rocky Mountain Goat, lives on rock and mountain scenery, as facetious westerners would have it, then indeed these hills should breed fat ibex.

About four o'clock we filed up the sandy floor of the Khor Mashail, the cañon where we were camped, and a mile or so above entered a tributary khor (stream-bed or ravine) and headed for the jebels (hills) above the Khor Shalalta. Up this ravine we moved silently, thankful that it was comparatively cool at this hour. However, the exertion of climbing soon made us wonder that we could have thought it was cool, and by the time we clambered up the rock-littered slope of the ridge where we were to take our posts, we were dripping wet. We took station with the two guides on a promontory which commanded a vast enclosed amphitheater and the sun had not yet appeared as we picked out places where we would be hidden against the rock.

There are two ways to hunt ibex in the Red Sea Hills, neither one of which is easy on the hunter. One is to climb the ridges and stalk the animal where you find it, the other, to climb up

¹The Taylor-Sudan Expedition, which was made possible only through the generosity of Irving K. Taylor, has enriched the American Museum collections by several thousand feet of motion-picture films and negatives, as well as more than 250 specimens of mammals, 500 birds, a small collection of reptiles, and many hundred specimens of fish. The Expedition was unusually fortunate in being able to preserve the fishes so that they retained most of their original coloring, and the color plate accompanying this article shows the brilliant shades displayed by the specimens when the tanks were opened in New York.



Camps were made where an occasional small tree afforded a bit of shade. Packs could be left in the open, for it never rains in the dry season

where ibex are likely to pass and then send native beaters out to drive these wild goats past the point where the guns are stationed. While the latter method may sound like a tame procedure, this is by no means the case, for the ibex are wary and it is no small achievement to kill a "billy" even if it has been driven down from some more remote fastness.

For beaters we employed the native inhabitants of the hills, the Hadendoa or Beni Amer, the "Fuzzy Wuzzy" of Kipling's poem. The "Fuzzy" is a splendid, picturesque type of Hamitic stock, with a huge head of hair which he dresses with grease, so that he greets the nostrils at about the same range as a flock of his own sheep. He is a mountain climber par excellence and about the only human being that can dislodge and press after a stubborn ibex. We had nine "Fuzzies" to beat the sky-line ridges and eight camel

drivers to take up posts on the lower divides and turn the quarry in toward the hunters. Several hours are required to surround an area and get the ibex started for a given post, and on the morning in question we saw and heard nothing until the sun was above the horizon.

Then a faint tinkle of sliding rock drew our attention to the slopes of the rocky hill to the northeast. Three gray-brown animals swept around the brow of the jebel and, after a short run, stopped and watched the eastern skyline. With our glasses we could see that they were ibex, but they were so far off that we could not judge the size of their horns. Furthermore the light was still poor, for the sun was low, and there were great patches of dense shadow where the hollows lay under the peaks. Presently a "Fuzzy" topped the crest, following the track of the band, and then other "Fuzzies"

bobbed up along the encircling ridges. The drive seemed well in hand.

Shouting to one another, the beaters pressed after the ibex which lost little time in seeking escape in the only direction left open to them. The animals tracked along in single file and with a marvelous sure-footedness, seeming literally to pour themselves across the steep slope into a shadow-filled ravine and at no time coming nearer than 500 or 600 yards from our stand. The beaters circled rapidly, cutting off escape on the far side of the rocks where the ibex had gone, and then tried to turn the animals in our direction. On the still air of dawn sounds carried far and the noise of small, dislodged stones was audible for half a mile, while one must needs have been deaf not to have heard the shouts of the "Fuzzies" and the avalanches of rock which they sent cannonading down the mountain-side to stampede the suspicious quarry. The ibex did

not want to be driven and when they could not break through on the side they desired they became stubborn and refused to move at all. On a later occasion I watched an ibex (the animal being unaware of my presence) through my binoculars when it was not in the mood to drive, and saw it go into a hole under a large rock where it calmly remained, ignoring tumult and loose rock until the men themselves were almost up to it.

This particular morning the beaters shouted to one another and converged upon the Jebel Shalalta with all their forces. "Fuzzies" hurrying up from the rocky ridges to the west drove out two hyenas before them. These big doglike carnivores trotted silently down a ravine and lost themselves in the gloomy depths of the Khor Mashail. I was glad of this glimpse of them for on our first night in the khor we had heard the cavernous howl of a hyena reverberating up the valley, an ominous



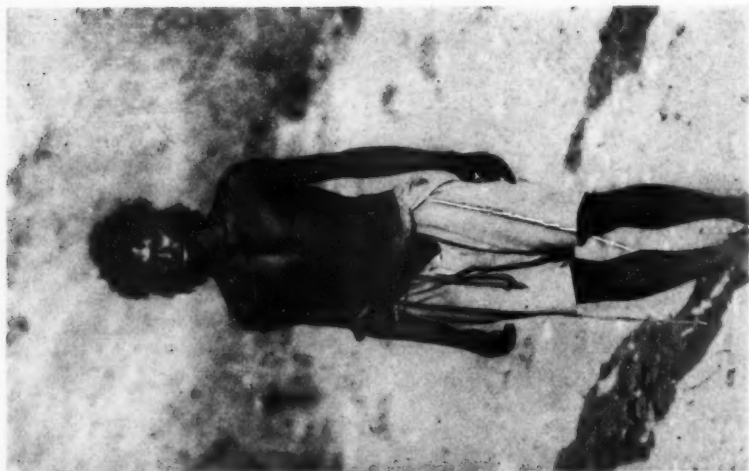
In the Khor Sharag our tent was pitched on the open sandy floor of the ravine, a veritable bake-oven in the heat of the day



This Fuzzy has a booming bass that rolled down the the rocky defiles



TYPES OF HADENDOA OR "FUZZIES"
In Tokar the Fuzzy wears full dress and a serious air of dignity



In the hills the Fuzzy does not burden himself with needless garments



The Fuzzy is a fine physical type and spends most of his time with his flocks in the hills



Not all of the Hadendoa wear their hair unshorn. Many of them keep their abundant locks trimmed close



The Red Sea Hills are a jumble of steep, rugged ridges, often destitute of vegetation and barren beyond description

sound suggestive of great power, sonorous and sinister, my first contact with wild hyenas.

The "Fuzzies" shouted "Ao, Ao, Ao," their name for the ibex, and ran along the rugged crests in sure-footed abandon. One native in particular had a great full-throated bass and when he poised on some precipitous crag, peering into the long shadows below, his bushy hair giving him the appearance of some unnatural being, I thought to myself "What a setting for the Peer Gynt Suite." When his rollicking "Ho, ho, ho, ho, ho" rolled in great waves of sound through the rocky defiles then indeed he became a gnome in the "Hall of the Mountain King."

The three animals we had first seen soon returned across the talus opposite us the way they had come, but now we had little attention for them for we

could see in the better light that they were females or young males, no good head in the lot. The natives were calling that a big "billy" was still lurking in the shadows and that we were to keep an eye open for his appearance. After thirty minutes of pandemonium, when shouts and crashing rocks aroused nothing more substantial than echoes, the "Fuzzies" walked into the deepest recesses and drove the ibex out into view. He was a splendid animal with great sweeping horns. Too far for a shot, he made a rather leisurely exit across the slope just below the crown of the jebel, stopping frequently to look back at the vociferous beaters and disregarding the rock dislodged from above in the hope of turning him down into the floor of the ravine. The ibex understood falling rock, and neither the

demoralizing din of its fall nor the actual striking of missiles near him caused him to hurry. He went just where he wanted to go, broke through the cordon at the spot where ibex had first entered the picture, and left the Jebel Shalalta. Our morning's hunt had bagged for us only experience but that alone would be worth the effort it cost, and the ibex had certainly deserved his escape by his refusal to be "rattled."

We soon learned that we could discount the native zeal for early rising. When Mohammed Ali (called Ali "Kebir," the "big Ali," to distinguish him from the many other Alis in camp), our head guide, said three o'clock, we said four and stuck to it. Upon one such morning the moon saw us mount our groaning camels and pad noiselessly down the khor for the Jebel Gadem, an hour or more to the west. Upon this occasion we took up separate posts and

in due course of time a good male was started. The regular program followed, a noisy convergence upon the spot where the "billy" insisted upon hiding, the failure of crashing rock to demoralize the animal and the eventual rout of the ibex by a native who walked into the hiding place. This time I could see the final routing of the beast and the "Fuzzy" was only a short stone's throw from the ibex before the animal admitted defeat by running away.

The "billy" successfully avoided me, whom he had doubtless located early in the game, but tried to cross from one ridge to another and dropped down into the ravine between the two. This brought him past the post where Mr. Taylor waited.

In less time than it takes to tell, the ibex crossed the khor and appeared at the foot of the long climb on the other side. As the animal came up on a great rock and stood poised for an



A Nubian ibex is a prize that can be won only by the expenditure of great physical effort, but he is worth all he costs

instant the ravine roared to the shock of Taylor's rifle and a white spurt of rock dust puffed up at the feet of the ibex. This did not alarm him any more than the rolling rock had done, and he began to climb deliberately for the sky. An ibex is not a large mark and at moderate ranges is missed surprisingly often. My rifle now took a part, but at such long range that it would have been more an accident than good marksmanship if a hit had been scored. Puffs of dust marked the path of the ibex until just as it was about to pass over the first low ridge and into safety, a bullet from Taylor's rifle found a mark and the hunt was over.

The ibex pitched clear of the rock where it stood and striking only two or three times fell almost sheer for a hundred yards. Strange to say this fall did not hurt the beautiful sweeping horns, although it did rub some hair off the body. The horns measured $21\frac{1}{2}$ inches, and although not as large as those of males killed later, gave us the greatest thrill of the trip because they were the first.

The fortune of the chase favored Mr. Taylor and to his rifle fell the next ibex secured, the largest head we took, measuring 38 inches along the horns. This "billy" was secured as the culminating event of a very long drive. Before daybreak we had departed from camp at Adelaueb and taken up separate stands on the Jebel Shalalta. The drive sent ibex part way along the

rugged shoulders of the peak but the animals turned back too soon and broke through the beaters before they could close up their widely extended line. The entire morning was spent in the effort to get the band, which contained two good males, back on to Shalalta but finally word was halloosed from the west that, as far as our stations

were concerned, the hunt was finished. The ibex were headed for the Khor Mashail and if they attempted to cross that we might get a shot later. We returned to camp and had lunch, while at intervals faint shouts in the distance told us that the Fuz-zies" were stick-



A young ibex makes an adorable pet

ing like hounds to the scent and were still in touch with the ibex. Early in the afternoon the shouting took up the sustained reiteration of the short word the natives all used when the action became thick, and our guides hustled us out of the shade (thermometer over 100° there) and down the Khor Mashail. Soon we separated and climbed up to posts which commanded the two ravines where the ibex were coming.

The sun was pitiless and there was no shade. Slowly I fried on a big slab of rock and hoped that something would happen soon so we could get back to the tent and shelter from the sun. The drive pelted into the ravines and then I could tell that the commotion was all passing down the one where Mr. Taylor was posted. Three or four ibex, females, appeared against the sky on a little peak that limited



Here and there in the desolate khors are native burial grounds, cairns heaped over with white quartz



A spotted hyena stops in wonderment as the flash is fired



But a striped hyena strikes the trip-line in full canter

my northern horizon. They evidently were slipping away from the beaters and waited just behind the peak, looking back the way they had come. A burst of firing in the next cañon roused the echoes and then comparative quiet reigned. The shouting ceased and the ibex in my vision returned to the rocky

slopes whence the drive had routed them. Mr. Taylor had secured a good "billy" and, incidentally, filled his license allotment.

Male ibex with good horns seemed to be so scarce about the Khor Mashail that we moved camp over to the Khor Sharag to permit me a better selection



Natives bring their camels to the Tokar agricultural show



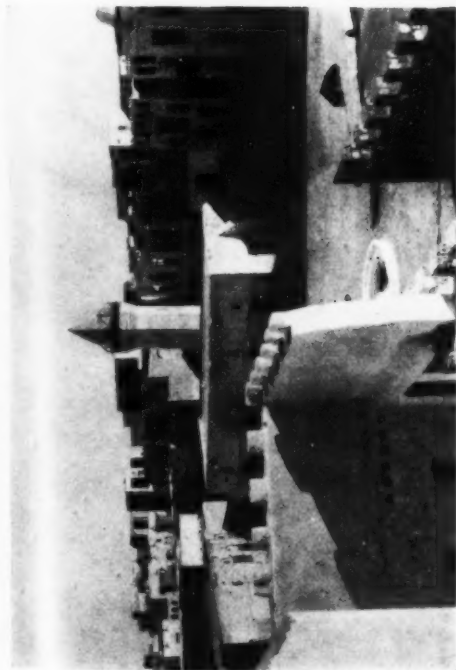
The matting exhibit is a great attraction



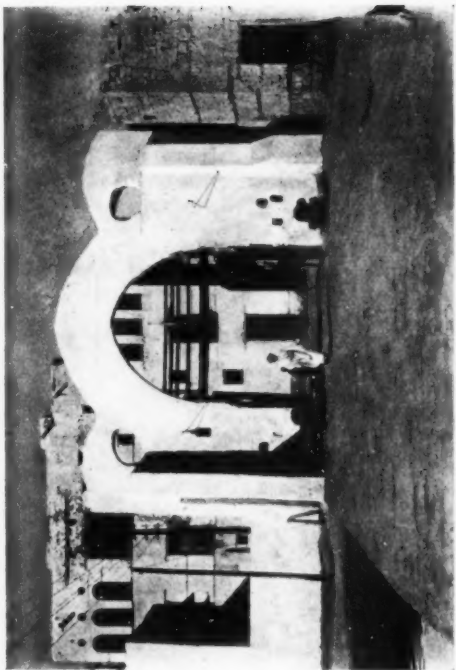
The native constabulary stand at attention



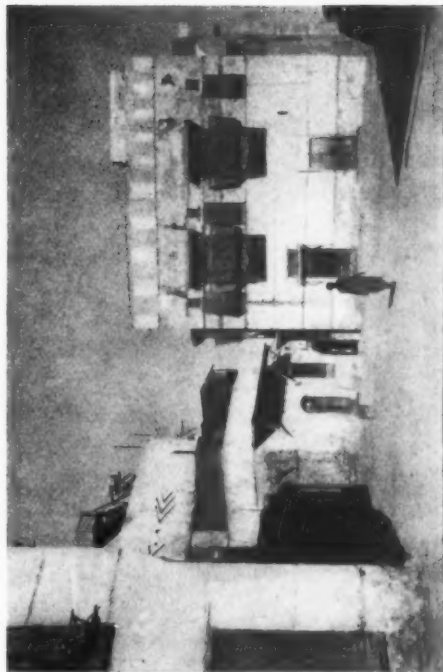
A cotton-baling contest is the main feature
SCENES AT TOKAR, BASE OF OPERATIONS IN THE RED SEA HILLS



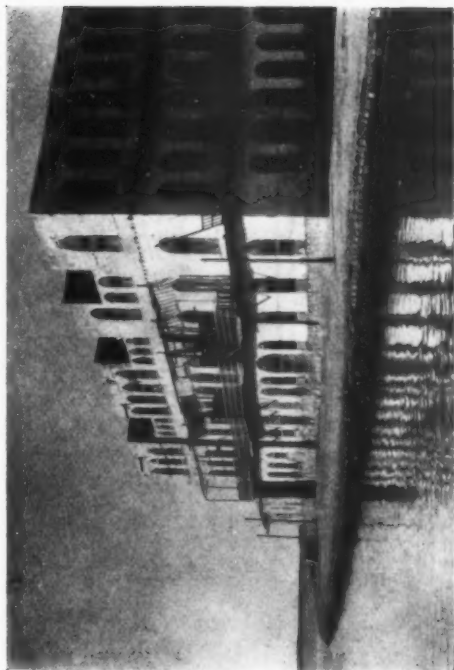
Suakin from the house-tops, a study in white walls



A gate at the end of a causeway leads into Suakin



The Turkish influence is shown by the shuttered windows



Crystal-clear sea water surrounds Suakin like a moat

SUAKIN, RAILROAD TERMINUS FOR THE RED SEA HILLS



From time immemorial the Fuzzy shepherd has tended flocks in the desert

for the remaining ibex I was allowed on my license. The Khor Sharag is marked on maps as being the bed of an intermittent stream, which comes to the surface here and there as a running brook. Everywhere we passed in the khor it was dry, and sun-baked sand and rock made up the landscape. The only water we encountered was in the shallow wells which the natives dug in the sand of the khor where they brought their flocks to water. We pitched our tents near these wells and watched the small bands of sheep, goats, and cattle as they scuffled by, kicking up what little dust there was and pressing forward eagerly for the long delayed drink.

Early the next morning I climbed the steep jebels above camp and found a station which gave me a broad outlook over a wild expanse of rough and broken country. The "Fuzzies" scat-

tered to the four quarters of the compass and Mohammed Ali and I settled back to wait for the drive. The first rays of the sun were welcome for the wind was cool up there and I was content to bask a while in their warmth and to enjoy the beginning of the day.

The rocks were beginning to take on heat when movement along a distant skyline caught my eye. The binoculars disclosed a fine male ibex. This "billy" was taking no chances and remained high, a characteristic ibex trait—to seek the highest spot on the horizon and play hide-and-seek about it. He shortly dropped out of sight and another long wait followed. Then out of the northern sky, right where I had seen the ibex and where I knew my beaters were focussing their attention, a band of domestic goats dropped over a ridge and began to work down toward



Mr. Taylor rides his white camel as if to the manner born

the wells in the khor below. A "Fuzzy" shepherd drove the flock and marshalled them in good order by shouts and grunts. He and his goats were silhouetted on a crest half a mile away but I could hear the click of each hoof against the rocks and the peculiar goat-like snort that the "Fuzzy" made from time to time. These natives have the faculty of emitting a resounding snort which is unlike any human vocal effort I have ever heard, and apparently it means something in the goat vernacular for the beasts follow a snorting "Fuzzy" better than they would be driven by a shepherd dog.

In spite of this disturbance, the drive came to a successful conclusion. In due course of time, three ibex, all "billies," popped up against the horizon—what a picture a male ibex makes with his superb horns clear-cut against

the sky—and ran down in the very tracks made by the domestic goats. The ibex circled and were headed by shouting beaters. The ring of excited "Fuzzies" drew tighter and tighter as the natives hurried up to the rallying call. A chant of "Ao, Ao, Ao" and "Ho, Ho, Ho, Ho," punctuated by the crashing din of falling rock brought us all to a fine pitch of excitement.

It was apparent that the beaters had the ibex about where they wanted them, but were having difficulty, as usual, in the final push to send the animals down our side. Ali and I peered around our little peak first on one side, then on the other, but we could see nothing. When we could stand the suspense no longer, the old guide indicated to me that we had best climb to the next peak, a few yards higher up, and look



Jebel Shalalta.—The highest peak and the most inaccessible ridge draw the ibex like a magnet into the basin which it masked from us. We slipped out from our concealment and hurried up to the next spur. A few minutes of peek-a-boo about the rocks, and Ali grasped my arm excitedly to draw me still farther out from my shelter. Leaning out over the crag, I found myself eye to eye with a bearded patriarch of the flock, a scant one hundred yards away. The ibex had been slinking off among the rocks and making such good use of the terrain that they had almost escaped the trap. Almost but not quite.

The "billy" fell in his tracks, lodg-

ing in the rocks which kept him from a long fall. At the shot, another splendid male ibex leaped into view, calmly took in the situation, and bounded down hill. He was followed by a third male, equally large. I had my needed specimen and did not molest the others but watched with admiring eyes that swift sure flight over a slope so steep and precipitous that a man could descend it only by the use of hands, feet, and an abundance of time. To my mind, the only mountaineers that surpass the ibex are the birds.

Preliminary reports on the Taylor Sudan Expedition have appeared in the Notes of NATURAL HISTORY for several numbers. The final report, giving full itinerary and results, was published in the May-June number.—EDITORS



The snows of Mt. Stanley, seen at daybreak from Iteréré

Ruwenzori from the West

By JAMES P. CHAPIN

Associate Curator of Birds of the Eastern Hemisphere, American Museum

A GLANCE at any map of Africa will impress one with the regular way in which the lakes along the western border of the Congo are aligned for a distance of 800 miles from the upper White Nile to the southern end of Tanganyika. They lie in the depressions of a giant trough, one of the two rift valleys which are striking geological features of the eastern half of Africa. The subsidence which formed these troughs has been accompanied by considerable volcanic activity, especially in East Africa. Mounts Kenya, Kilimanjaro, and Elgon are all extinct volcanoes, but the Ruwenzori Range, rising between Uganda and the Belgian Congo, is not a product of volcanism. There are some small craters near its eastern base, and eruptive rocks in a very few places on the eastern flank, but Ruwenzori is an exaggerated upheaval along the border of the Albertine Rift, here traversed by the Semliki River.

Our first visit to the Ruwenzori Range was from the northeast. Frank Mathews, of our party, was soon to return to America to enter medical school, so we made a quick trip from Kampala by motor, and found that from Fort Portal we could drive right to the foot of the steep, grassy slopes of the northern extension of the range. We climbed to the bamboos on the summit of Mt. Musandama (8000 ft.) and visited the Buamba Pass, but the snow peaks remained hidden in clouds except for one brief spell when De Witt Sage was lucky enough to be looking toward them.

The eastern slopes of Ruwenzori have been relatively well studied, and from that side the Duke of the Abruzzi in 1906 and Captain G. M. Humphreys in 1926 have led their parties to the loftiest peaks of the range. We planned to devote ourselves to studying the birds of the western slopes, and had no intention of scaling the snowy

summits. Having said good-bye to Mathews at Jinja, Sage and I betook ourselves to Lake Albert, and thence through the Ituri District to the Belgian post of Beni. On a few days each year the snows of Ruwenzori reveal themselves to dwellers in Irumu, eighty miles away; but we were within two days of Beni before we beheld this impressive spectacle through the dark green foliage of a tropical forest. The post has been moved from old Beni, on the Semliki, where the blacks were fast perishing of sleeping sickness, to a higher and more healthful site known to natives as Bungulu. The panorama of Ruwenzori is finer from the old situation, but from near the new post Mounts Emin, Speke, and Stanley, each of them a group of snow-laden peaks, often stand out clearly. The rains were so heavy in October (1926) that we waited until November 5 before setting out for the mountains. Elephant-grass country stretched down to the Semliki River, but on its opposite bank we reentered the forest. Two days more, and we came out into high grass and native farms, where the Butahu River¹ issues from the western base of the mountains. This district is the Karevia of Emin Pasha and Doctor Stuhlmann, where the latter in 1891 began his historic ascent to 13,326 feet. We were to follow almost the same trail.

The Wanande people of the vicinity were under the rule of old chief Bambumé, whose attitude was cordial and helpful. His predecessor, Kengeré, had held other views. About the time when the Duke of the Abruzzi, from the Uganda side, was scaling Margherita Peak in 1906, the British Museum Ruwenzori Expedition found its rear-guard being attacked in the

Butahu valley, and was forced to abandon work.

On the southwest, the lower slopes of Ruwenzori are covered with a growth of canelike elephant grass, all but impenetrable. This is the case most of the way around the range, save for some ten miles in the middle of the west side, where they are forested. On all high mountains near the equator, as one climbs upward, varying belts of vegetation are traversed, until plant life finally disappears before eternal snow and ice. Parallel changes in the fauna are to be observed, especially noticeable in the case of birds. This altitudinal distribution of birds was the principal subject of our investigation.

From Bambumé's we forded the swift, foaming Butahu River, and climbed through elephant grass up a steep slope to the village of Ra-u, where the aneroid read 6000 feet. One hundred and fifty feet higher we entered the mountain forest. An abundance of tree-ferns beautified this woodland, where we walked on in rain and fog. Following along the northern declivity of the Butagu valley, we stopped that night at a group of huts called Ibalé, close to 7000 feet.

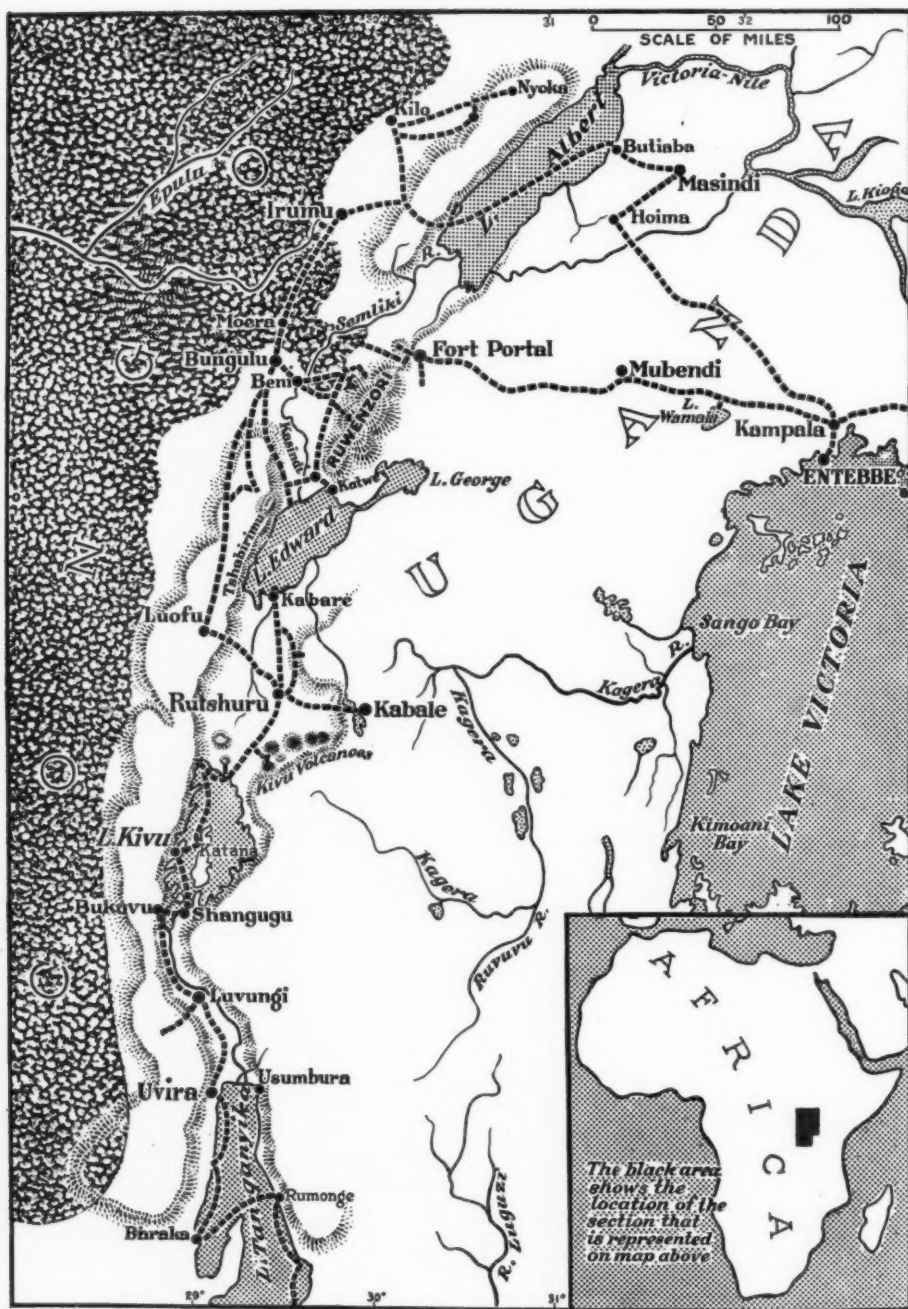
The next day we climbed downward as much as upward, and ended our march at a place called Kalongi. The word Kalongi is derived from the bamboos; and here patches of bamboo come somewhat lower than usual, to about 7200 feet. About Kalongi the native huts are scattered widely on both sides of the Butahu gorge, but the two headmen, Muribati and old Molen-gikani, could furnish no more than seven porters. The population is scanty, and there is no village higher up.

The rains were by no means finished here. We pitched our tents in mud.

¹Often written Butagu, but Stanley's spelling has both priority and accuracy in its favor.



ALEXANDRA PEAK, 16,749 FEET, FROM JUST ACROSS THE LAST VALLEY. GIANT
ICICLES HANG FROM THE SNOW CORNICES



ROUTES OF THE RUWENZORI-KIVU EXPEDITION

Arriving at Kampala, July 19, 1926, the Expedition reached Rumonge on Lake Tanganyika July 26, 1927. The Congo Forest is here shown in black mottling

Almost every day it rained; fogs shrouded the mountains. This was to be our base camp, so we retained but twenty porters, to whom we gave blankets; our "boys" and guides receiving coats and sweaters as well.

As a guide for our mountain work we engaged a young and vigorous man, Vaonika by name, who had already accompanied Edmund Heller about a year previous. One or two of our other men amused us all by continually blowing shrill blasts on wooden whistles to drive off the rain clouds as they streamed up our valley, but this magic produced little result. It was November 21 before the weather permitted a fresh start.

The path toward the snows follows a long ridge, to avoid the boulders and tangled vegetation in the gorges. So after crossing the Kanyamwamba brook at 6720 feet close to Kalongi, the next brook—and a very small one—is encountered at 12,800 feet just below a ridge called Itereré. First we traversed patches of scrubby mountain forest and old clearings with bracken and luxuriant herbaceous plants, then areas of large bamboos interspersed with trees, and at 8100 feet reached the first heath trees, where the natives are wont to go to propitiate the spirits of the mountain when rain is desired down in the valleys.

For months Sage and I had been asking ourselves whether it would be feasible to reach the permanent snows from the Butahu Valley. Since Stuhlmann's time most visitors had stopped on a mountain at 13,800 feet, where it became the custom to leave a record in a bottle. Beyond this, it seemed, a deep cañon barred the advance.

The first tree-heaths at 8100 feet were only a broken strip extending down the ridge. The bamboo, we

found, continued on up to 9300 feet. Then the whole slope became clothed in lichen-draped heath trees, with the ground hidden under a thick green blanket of moss. Curiously enough, at the upper edge of the heath belt, the heath trees again extend upward in strips along rocky slopes and ridges, to 13,500 feet, whereas in the valleys they are replaced as low as 12,800 feet by open alpine vegetation, consisting of aborescent groundsels, giant lobelias, and a carpet of *Alchimilla*.

The heath and moss zone is the most disagreeable section on Ruwenzori. We had to camp in it, and even in the most favorable places it is so rough that there is scarcely a spot fit to serve for a tent. Old fallen trunks, hidden under the moss, conceal deep holes into which one falls most unexpectedly. It is always wet among the heaths. Frequent drizzles and fogs replenish the supply of moisture in the moss, which is so saturated that one dares not sit on it.

Our first camp in the heaths was at 12,050 feet, within three hours of Itereré (otherwise known as Kambi ya Tshupa, or "camp of bottles"). Following Heller's advice, Sage and I climbed on November 23 to Itereré, hoping for a good view of Mt. Stanley and its glaciers. We sent most of our porters down to wait at a camp in the bamboos, and took with us only a few of the mountain dwellers. Our hopes were not fulfilled, for we waited several hours in the fog, and had but one short view of the lower snow slopes. We read the paper left by Heller, but most of the earlier records were lost because of the water which in some mysterious manner always finds its way into the bottles.

As we stood on the crest of the ridge at this spot, we looked down into a



Left. — Heavy low-land forest at the western base of Ruwenzori (altitude 3300 feet) with a brook flowing from the mountains

Center. — Wild banana plant in the mountain forest at 6750 feet near Kalongi



Below. — A glade in the bamboos above Kalongi at 7600 feet. The largest bamboo stems were $3\frac{1}{2}$ inches in diameter



Right.—Camp in the heath zone (11,200 feet) where we spent the night of January 1-2

Center.—One of our carriers beside a flowering *Lobelia* plant.¹ In the left background are aborescent groundsels *Senecio*



Below.— Vaonika in the path through the deep moss of the heath zone. This is the most disagreeable section on Ruwenzori

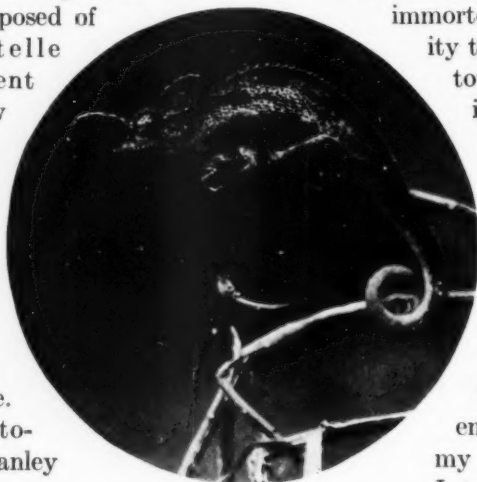


deep gorge coming from the glaciers, now little more than two miles away, and directly beneath us lay a small lake, black as ink. The vegetation about us was composed of woody *immortelle* bushes, arborescent groundsels, a few giant lobelias, *Hypericum* trees with large orange-scarlet blossoms, and a carpet of *Alchimilla*. Here and there were large tussocks of sedge. The classic photograph of Mt. Stanley by Stuhlmann, as we afterward ascertained, was taken from this very same ridge, but a little lower down.

The next day Sage climbed again to Itereré. He took with him a small tent, and spent a night alone hoping for better weather. He had the usual bad luck, speaking meteorologically. When I rejoined him in the afternoon, he had had but a few fleeting glimpses of the higher peaks. That evening I was to mount guard, Muribati and Vaonika keeping me company. Sage had not been gone a half hour when the air cleared, and almost until sunset I was busy with the camera, making a record of the perfect panorama of Mt. Stanley's summits. The next morning was likewise clear, with a more pleasing side light on the snows. Our porters down below had now practically exhausted their food supply of green plantains. They were to come up for me on November 26, so only half a day remained. It seemed a simple matter to continue on up the

ridge, and I broached the subject to my guides. They objected that they had never gone higher and that there was no path between the tough *immortelle* bushes. In reality they feared to be led toward the mysterious white peaks.

Pretending that I merely wished pictures from higher up, as well as plants for the herbarium, I urged them on, until finally they threatened to leave me to my foolishness. When I took their machette to cut my own way, my "guides" followed reluctantly fifty yards behind. After half-past



A chameleon from the mountain forest near Kalongi, bearing a spoonlike protuberance on the nose

nine fogs crept up the valleys and enveloped us, but I had prepared a sketch-map to avoid being lost and we made our way slowly upward. Our ridge appeared to culminate in a rocky summit almost in line with Alexandra Peak, the latter the second highest peak of the whole range, and from this angle concealing the highest of all, Margherita. About noon we finally reached the top of the mountain we had in view, and were rewarded by a sudden parting of the clouds revealing Alexandra Peak in all its dazzling glory, as well as a lake of olive-green color directly below us. Before us was a precipice and then a lovely alpine valley stretching over to the foot of the glaciers. Just below the finest of the glaciers gleamed another little pond of lighter green color. Our sharp mountain top continued as a ridge to the northward, and there seemed a pos-

sibility in that direction of crossing the head of the valley, and thus attaining the rocky slopes that bordered directly on the glaciers.

Nothing more could be done that day. Food for the men had given out, and we retreated to a camp in the bamboos at 8960 feet. Above the heath zone we had seen but few birds, yet they were well worth while. Most beautiful among them was a large sunbird, *Nectarinia johnstoni dartmouthi*, which found its food mainly on the tall flower-spikes of the lobelias, and was often active while the mountain was heavy with fog. In the bushes skulked a small brown-and-green flycatcher, *Cryptotopha umbrovirens alpina*, more of a warbler than a flycatcher in habits. Both these species dwell on other mountain tops in eastern and central Africa, but vary subspecifically in different places. We also noted a large starling (*Cinnamopterus tenuirostris*), huge white-breasted swifts, (*Micropus melba maximus*), ravens (*Corvus albicollis*), a buzzard (*Buteo oreophilus*) resembling the young of our

red-shouldered hawk, and a brown duck—presumably *Anas sparsa*.

Besides the rats which make their homes amid the grasses and *Alchimilla* of the alpine zone, there are hyraxes which screech and croak during the frosty nights, a small antelope (probably a duiker, though we saw only its tracks), and leopards, apparently quite numerous.

After the end of November a dry spell began in the upper Butahu valley, which greatly favored our work. The heath zone is exceedingly poor in birds. Day would break in almost deathly stillness, or at most the chirping or chuckling calls of a mountain turaco would reach us from the valleys. During a day's march through the heath woods one may see no more than three or four small birds, among them most likely a red-breasted sunbird (*Cinnyris afer stuhlmanni*). The thick blanket of moss, to my surprise, seemed practically void of runways or any other sign of rodents. As we went down the mountains, birds again became more numerous where the heaths



Our hut at Kalongi, built of bamboos and grass in two days, cost one dollar



Looking down 10,000 feet into the Semliki valley, from Itereré

gave place to bamboos and other trees. So for eight days I stayed on a ridge at 8960 feet, where some small purplish fruits attracted numbers of mountain turacos (*Ruwenzorornis johnstoni*). Here, too, there were large francolins (*Francolinus nobilis*) which could be trapped, although impossible to see in the undergrowth.

The bamboos themselves have little to offer in the way of food for birds; but on Ruwenzori they are mingled with many other kinds of trees, including the African yew (*Podocarpus*), and thus the bamboo zone harbors a varied bird fauna. In it, also, live many rodents and shrews, as well as a few golden moles, and monkeys and bush pigs. On this flank of Ruwenzori elephants and buffaloes climb no higher than 7000 or 8000 feet, and while chimpanzees are found in the lower mountain forests, it is certain that no gorillas dwell on the range. Across the upper Semliki valley in full view, rises the

Tshabirimu range, northwest of Lake Edward, and there the gorilla is known to occur.

On December 5 I rejoined Sage at our base at Kalongi, and despite an abundance of work during the rest of the month, I was ever longing to stand amid snow. The two difficulties were porters and food to give them. True, our guides and porters insisted that no European had ever asked to go twice to Itereré, and that they would refuse. Several mishaps occurred. The old chief Bambumé was reported to be ailing, and on December 12 he died. There was a day or two of anxiety, as the natives were plainly annoyed at our staying on their mountains, and might easily connect our unwelcome presence with their tribal misfortune. Nothing happened.

At about the same time our cook and three of the best bird-skinners deserted. They were men from the Mangbeta country of the northern Congo. Yet

we managed to celebrate Christmas with a dinner perhaps more copious and varied than well cooked. We had learned that rice could be bought of natives in the Butalinga country, some four days off in the Semliki valley, and men were dispatched to get five baskets of it. These arrived toward the end of December.

After days of argument and bargaining, Muribati and Vaonika had been won over to my plan. The porters demanded payment before setting out, but on the morning of New Year's Day, we were ready to start. We had thirteen men, but several would be carrying rice and water, so Sage elected to stay down, and see to transporting our base back to the Semliki valley. With my little party, four baskets of rice, and one iron barrel filled with water, I started up again through the bamboos. That night we slept in the heaths at 11,200 feet, and the second night we camped on top of Itereré. Life above the heaths would be more agreeable if the altitude did not affect one. The third day, as we regained the mountain top at 14,900

feet my pulse was racing at 120 per minute, but it was a happy moment.

We pitched a Whymper tent in a sheltered spot amid the rocks, filling the crevices beneath with immortelle bushes. All the men except my two guides returned to lodge at Itereré. We were to allow a full day for the trip to the glaciers. Then the porters would return for my tent and bedding. The afternoon was spent looking for a way down the cliffs ahead. I found a gully that took me part way, then a ledge across the face of the rocks, and finally a way to scramble off it on to a talus covered with senecios. Arriving there I concluded the rest was easy, and climbed back to our camp. Muribati and Vaonika, as expected, refused at first to go farther, and more argument and further promises of coats and blankets were necessary.

The next morning was clear, and permitted further photographs, while 150 or more giant swifts skimmed and sailed about over us. As we climbed down the cliff, my companions carrying my cameras and tripod, clouds began to obscure the peaks; but we



The more northern of the two glaciers visited was riven with crevasses. This photograph was taken near the highest point reached

knew the way by heart, and were soon in the valley. Over the boulders and the green moss, through groves of tree-senecios we walked, until on mounting a low ridge, we found ourselves within a few hundred yards of the green pond at the foot of the nearest glacier. The goal was within reach; and when my black comrades announced that they would stop here, and that I must go to the glacier alone if I liked, it mattered little. They were convinced they would die if they touched the mysterious white substance, and I knew their bare feet would not take them far on ice. So with kodak and boiling-point thermometer I set off.

At the pond, on which floated a thin skim of ice, I found its green color due not to the clear water, but to a soft gray-green mud which covered the bottom. Just above the pond lay the lowermost margin of the glacier, shelving down to a rather thin border, not an abrupt wall. Two small rills flowed toward the pond. The whole lower end of the glacier was free of snow, which plainly had not fallen there for weeks. The water in the hypsometer here boiled at 186.3° , and subsequent calculation gave the altitude as 14,627 feet. A short climb up the slippery rock at the side of the glacier brought me to the jagged boulders of the lateral moraine, on the northwestern side. To my left rose a steep black mountain, without snow; to my right ran the smooth rounded border of the glacier, a stream gurgling underneath. It was easier to walk on the rocks than on the icy slope, though there were no crevasses. Most of the peaks above me were wrapped in fog, but at intervals this would clear in places.

Continuing upward, I found that the mountain beside me was connected with the base of Alexandra by a low

ridge of rocks and earth. As soon as possible I scrambled to the summit of this, and found myself facing the southern edge of another glacier, much rougher than the one I had just left, and which turned toward the northwest as it continued downward. Following along the crest of the bare ridge between the two glaciers, I soon came to the very base of Alexandra, at an elevation (by aneroid) 800 feet above the foot of the more southerly glacier, or approximately 15,400 feet above sea level.

The summit of the Alexandra Peak, according to the Duke of the Abruzzi, is 16,749 feet, that of Margherita 16,814. These two highest peaks of Ruwenzori, forming the northern end of Mt. Stanley, towered directly above me, but even their slopes were now hidden in fog. Two ravens (*Corvultur albicollis*) flew back and forth overhead, but what they could find to eat there remains a mystery. All vegetation had vanished. The southerly glacier stretched away upward, apparently very smooth, toward the col between Moebius and Alexandra peaks. It looked like easy climbing, but without a companion or even an ice-axe, at this hour, it was idle to dream of going farther. The northerly glacier came tumbling down the precipitous sides of Alexandra.

It was about two o'clock in the afternoon when I started down the side of the glacier again. Beyond the pond I rejoined my two "guides" beside a fire of senecio wood. Vaonika had finally found courage to visit the pond in search of water, noted the floating ice and melted pieces of it in a tin can over the fire. Thus they were convinced of the nature of ice and snow.

The valley where we stood seemed never before to have been marred by a

human footprint. It had been several years since I had read De Filippi's *Ruwenzori*, and like most people I had overlooked or forgotten the ascent of Dr. J. David in 1904. From the brief account of his ascent by Revelli,¹ it is evident that we took the same path he did, up to Itereré, which he wrote Itêre. From there his route is less easily recognized, but he speaks of reaching a ridge at 4300 m. (14,104 feet) from which he saw on his left the final amphitheater of the valley. On his right a green lake and beyond them the tongues of the glaciers. There is every reason to suppose that this was the point where we made our highest camp. He is silent about the crossing of the last valley, but I have little doubt that the glacier he climbed was the more southerly one of those I visited. He may therefore have reached the snow pass between Moebius and Alexandra Peaks. Only his "tooth" of gneiss rising 50 meters above the snows is difficult to locate, though a photograph taken by Sella² lower down to the west of this pass seems to show a smaller rocky projection. David gave the altitude of his snowy ridge at 5000 m. (= 16,404 feet), and said the highest peak (Alexandra would have looked so) was to the N.N.E., some 400 m. (1312 feet) higher. As this would make Alexandra 17,716 feet high, there is clearly an error in his calculations. Possibly he stopped at almost the same spot as I.

In any event it may be stated that our ascent to the glaciers of Mt. Stanley from the west was the second. But a far more remarkable feat was performed by Capt. G. N. Humphreys and his companions early in 1926, when

they descended from the pass between Mounts Emin and Gessi toward the northwest into the Semliki valley. And in July of the same year Captain Humphreys made the second successful ascents of Alexandra and Margherita.

My old friend, Dr. Joseph Bequaert, tells me that in 1914 he reached the crest of the ridge where we pitched our highest camp, just across the valley from the glaciers. He found it covered with light snow. We seem to have had exceptional good fortune with respect to the dryness of the weather in the first days of January, 1927. Very likely December and January are the best months for visits to Ruwenzori from the west.

The descent from the snows was rapid. In six days we had gone from the highest native farms to the glaciers and back, allowing sufficient time as well to stop for photographs, and to collect some birds and plants. On January 8 I rejoined Sage in the Semliki valley; and after a trip to the northern shores of Lake Edward, and a brief visit to the strip of lowland forest which extends from the west across the Semliki to the slopes of Ruwenzori and there fuses directly with the mountain forest, we returned to Bungulu.

As we mounted the hills again on the western side of the Semliki valley, we looked back at the gray mass of Ruwenzori crowned with unsullied snows. We recalled the weary days of panting effort as we climbed the tangled ridges or toiled still higher over the soft *Alchimilla* carpet, beneath the grotesque, over-developed groundsels. Then came back the triumphant hours amid the glaciers of Mt. Stanley, and silent thanks were rendered to the generous friends at home who had given us this unforgettable experience.

¹Boll. Soc. Geogr. Ital., 1906, VII (4th Series), pp. 254-365.

²De Filippi, *Ruwenzori*, 1908, p. 209.



From a pencil sketch by Stanislas Rembsky

Albert Operti 1852-1927

ON November 5, last, a modest, unassuming man finished a life of unselfish devotion to the highest of ideals, and quietly and unobtrusively as was his wont, passed away from the large and distinguished group of those who honored and loved him. Admiral Robert E. Peary, who

was among those who knew him best, once wrote that he has "made History, aided Science, ornamented Art," and he added an even higher tribute to this when he said "Your integrity, coolness, knowledge and good judgement in times of danger were tried out when you were with me in '96 and '7." It was

characteristic of the man who received this letter of highest praise from such an authority that he should hide it away, suppress it. He knew what Admiral Peary thought of him, but he was unwilling that even his intimates should share this knowledge.

Albert Jasper Ludwig Roccabigliera Operti was born in Turin, Italy, on March 17, 1852. His father, Guiseppe Operti, was a musician, celebrated in his day as pianist to Victor Emanuel II, King of Italy, and later as band master to the Eleventh Hussars, the famous "Light Brigade" of Balaklava, and as director of the Italian Opera Company of London.

The early boyhood of Albert Operti was spent in the British Isles, where he attended school in Dublin, and high school in Glasgow. At the age of twelve, a time of life when most boys of today are well satisfied to read romances of sea life and adventure, he became a cadet in the British Naval School at Portsmouth, and after two years' training went to sea, serving for four years in the British naval marine.

When one looks upon those masterly paintings of ships and expanses of sea which Operti produced in his later life, one realizes how much influence this early experience had upon his work. He painted these things, not from hearsay or from casual observation, but from actual intimate knowledge, the essence of Truth.

During his life at sea, Cadet Operti occupied his spare time in drawing and painting. The passion for art which, no doubt, was his heritage from his musical father, asserted itself to such an extent that upon finishing his naval training in 1870, he resigned from the navy and entered the Glasgow Institute of Art. Here, and later in Paris,

he studied painting for five years, specializing in scenic, fresco, and portrait work.

Meanwhile the elder Operti had located in New York as a musical director, and in 1875, Albert joined his father, completing his art studies in America under such masters as Vassili Vereshtchagin, the Russian realist, and Matthew S. Morgan, the founder of the Art Students League. Albert Operti had a talent for scenic composition both in form and color, a talent that found expression in many sets of scenery painted by him in the '80s and '90s for Niblos Garden and for the Metropolitan Opera House where he was employed as scenic artist. Some of us will remember the charm of these old sets for such operas as *l'Africaine*, *Aïda*, and *Cavalleria Rusticana*, which came to life under Operti's brush. They were the finest things in scenery in their day, and like the bygone singers who sang in front of them, they are part of our memories of a time of grace and beauty—the closing years of the last century.

As far back as 1881 Albert Operti began to be interested in polar exploration. The appeal of the sea, of adventure, and the search for new lands in the frozen North fired his imagination. The mantle of William Bradford, one of his masters in painting, descended on him, and in so doing, lost much of Bradford's stiffness and formality. An interview with Admiral G. W. Melville, survivor of the Jeanette Expedition in search of DeLong, resulted in his painting his first Arctic picture "The Finding of DeLong." He also painted at this period a number of canvases of Arctic exploration, two of which, "The Rescue" and "Farthest North" now hang in the Capitol at Washington.

Always scrupulously careful as to the detailed accuracy of his work, Operti now began the fine collection of books on Arctic travel, life, and customs, which he bequeathed to the Explorers Club. He read everything he could find that would help him to depict the great region of frozen beauty about the Pole. But this did not satisfy his passion for truth in art, he wanted to see this country of icebergs and auroras, of vivid sunrises and flaming snow. At last his opportunity came; Commander Peary asked him to join his next expedition to the Far North as official artist. He made two voyages with Peary, 1896 and 1897, bringing back with him a wealth of studies and sketches of the animal life and people of the Polar region, their customs, manner of life, and surroundings. These were made at the cost of the greatest hardship, danger, and privation, and under actual working conditions that would have daunted many an artist of less enthusiasm and resource.

The results of Operti's share in these expeditions are among his best work. Executed in various mediums, his sketches are accurate, vivid, and vigorous. He made the first plaster casts that were ever taken of the North Greenland Eskimos. These are now in the American Museum of Natural History.

With his reputation as an artist of ability now fully established, Albert Operti began to reap the fruits of twenty years of conscientious and talented work. He was one of the official artists selected by the Government for the Chicago Exposition in 1901, and in 1912 he came to the American Museum as general artist and cartographer.

Throughout the last period of his life Operti painted many backgrounds, and some murals and friezes for the Mu-

seum. Some of the largest and most important of his backgrounds are now in the Hall of Mammals. They cover a wide range of subjects, but are universally characterized by exactness of detail, which however, is achieved without in any degree sacrificing the breadth and freedom of treatment that constitute their outstanding quality. Among them may be noted habitat backgrounds for the Wapiti Group, the Mountain Sheep Group, the Muskrat Group, the Baboon Group, and the King Penguin Group, ranging in scenic effects from the vivid sunlight of an African water hole to the icy beaches of South Georgia Island, and from the uplands of the Cascade Range in Washington, to a swamp in Plymouth, Massachusetts.

Although notable in his handling of color, Operti was also a good caricaturist and illustrator. Some of his illustrations, executed in line and with the brush, were made for such books as *Northward Over the Great Ice*, *Through the First Antarctic Night*, and *The White World*, as well as for a number of novels by L. P. Gratacap, which include *Benjamin the Jew* and *The New Northland*. In these, as indeed in all of his work, he always verified with careful study the details of his composition, checking his wonderful memory with a voluminous mass of illustrative data which he kept in several thick scrap books. His memory might be described as kaleidoscopic; he could recall and paint scenes that his eyes had looked upon years before. He seemed to have some wonderful gift that enabled him to reach back into his impressions of the past and materialize them as though under the spell of white magic.

Operti was accustomed to paint with great rapidity. A mural which he made for the New York City Bicentennial,

and which measured upward of seventy-five feet in length, occupied him but three days. There is a story extant in the American Museum concerning a group of visitors, who happening upon him while he was engaged in painting the frieze background for the dolphins in the Third Floor South Pavilion, were astonished to find the artist, a whitewash brush in each hand, laying on the colors contained in two buckets with dexterous sweeps. They were still more amazed when, after having had their attention called to another matter of interest, they found that the painted ocean had flowed in upon the wall, literally while their backs were turned.

A serious accident, which occurred in 1925, and which nearly resulted in his death, greatly impaired the activity of Operti during the last years of his life, and no doubt hastened his end. For nearly a year before his fatal illness, his footsteps faltered and his hand shook. But however much his hand trembled as he went his daily round of tasks, it was always steady when he took up a pencil or a brush, and his last sketch, a design for the menu of a dinner that was to have been tendered to Captain Amundsen by the Explorers Club, was executed with as much vigor and cleanness of line as when he sailed the seas with Peary.

Always averse to advancing his own interests, Albert Operti never reaped the pecuniary rewards which should

have been his. He has written many times upon the fly leaves of his books the sentence, "I have resolved to devote my life to the cause of learning. In place of a life of ease and freedom, I have chosen a career of anxiety and toil. A man has higher responsibilities than the seeking of his own enjoyment. He should devote himself to honorable labor and to Love." Such a life was his; his labor was to the highest degree honorable, and his love was great. If toward the end his steps dragged along the way, yet in his heart there was always the song that was often on his lips.

Perhaps I like best to remember him as he sat, dignified yet genial, the guest of honor at a dinner given two years ago by his fellow artists and workers of the American Museum. They acclaimed him one and all as their mentor in art, and they gave him a testimonial which may well stand as his epitaph:

"Because our esteemed co-worker Albert Operti has throughout a life of devotion to Truth and Art made the world about him more beautiful, and by his Courage, Faith and Laughter made the people about him more wholesome and human, we his fellow-workers in the American Museum of Natural History, do hereby confer upon him the degree of Master Craftsman, and do give him this Certificate of our esteem."

HERBERT P. WHITLOCK



NOTES

ASTRONOMY

DR. HARLOW SHAPLEY, director of the Harvard College Observatory, addressed on December 15 the largest audience that had yet assembled at a meeting of the Amateur Astronomers Association. One thousand persons were present and listened with absorbed interest to Doctor Shapley's clear and masterly exposition of "Current Researches at the Harvard College Observatory."

"THE HEAVENLY BODIES" was the subject of the UFA motion picture film shown at the January 5 meeting to an audience of nearly 1300 people.

THE PROGRAM OF SPEAKERS up to March 1, 1928, has been arranged as follows:

JANUARY 19—Mr. David B. Pickering, president of the American Association of Variable Star Observers, will speak on the romance of variable stars and the thrill and adventure in their discovery and observation.

FEBRUARY 2—Mr. Oliver P. Medsger, teacher of astronomy in the Lincoln High School, Jersey City, N. J., will speak on "Jupiter."

FEBRUARY 16—Dr. Anne S. Young of the Mount Holyoke College Observatory will describe her trip to Giggleswick, England, for the purpose of observing the recent total eclipse of the sun.

MARCH 1—Mr. Stansbury Hagar, authority on the mythology of the stars, will speak on "The Mythology of the Constellations of the Zodiac."

THE AMERICAN ASTRONOMICAL SOCIETY, the largest group of professional astronomers in America, has just accepted an invitation from Director Sherwood to hold its next winter meeting, December, 1928, at the American Museum of Natural History.

DR. CLYDE FISHER represented the American Museum at the annual meeting of the American Association for the Advancement of Science at Nashville, December 26-31. An outstanding feature of the Astronomical Section was an address before the General Session, Wednesday evening, December 28, upon "Edward Emerson Barnard, His Life Work," by Dr. Robert G. Aitken, associate director of the Lick Observatory. It is an interesting coincidence that Doctor Barnard, who was one of America's greatest astronomers,

began his work in Nashville. A fine exhibit of Barnardiana was arranged for astronomers and other scientists attending this meeting.

At this convention Doctor Fisher presided over one day's meeting of the American Nature Study society, presenting an address on the work of the Coördinating Council on Nature Activities. He also represented the American Museum at the meetings of the Botanical Section and of the Wilson Ornithological Club.

NEWTON BICENTENARY.—The bicentenary of the death of Sir Isaac Newton (1642-1727) was commemorated at the American Museum of Natural History November 25-26. Meetings were held in collaboration with the American Astronomical Society and several other scientific organizations, and were addressed by leading American scientists in the fields to which Newton made contributions. Dr. W. W. Campbell, honorary director of Lick Observatory and president of the University of California, read a paper on "Newton's Influence on the Development of Astrophysics."

Among the Newtoniana which were on exhibition at the Museum for three weeks were all of the various editions of Newton's books, including an extremely valuable copy of the *Principia* from the Babson collection, and a copy which had been presented to Yale College by Newton. A model of the sun dial made by Newton when a schoolboy, and a model of the first Newtonian telescope were also shown. Altogether the exhibit included several hundred items consisting of books, portraits, medals, letters, and documents relating to Newton and his achievements.

BIRDS

BARRO COLORADO ISLAND BIRD GROUP.—On December 8 the first of a series of twelve groups to illustrate bird life in the principal faunal zones of the world was opened to the public. It is based upon Curator Frank M. Chapman's notable studies at the island in the Canal Zone which has been set aside as a station for the investigation of tropical natural history. Associated in the field with Doctor Chapman were Messrs. Francis L. Jacques, who painted the background of the exhibit, and Raymond L. Potter, who mounted the birds. The group was presented to the Museum by Dr. Evan M. Evans.

The visitor to the new exhibit seems to stand on a vantage point in humid tropical forest, looking down the slopes of Barro Colorado and across the Panama Canal toward distant mountains. The arboreal birds, half hidden in heavy foliage, include macaws, parrots, toucans, woodpeckers, motmots, trogons, woodhewers, cotingas, manakins, flycatchers, and tanagers, while among the ground-living species are tinamous, doves, quail, and ant-birds. The latter are following a train of army ants, feeding upon the insects that the advancing ants have driven from their hiding places. The ensemble gives but a suggestion of the 220 species of birds which have thus far been observed within the 3500 acres of Barro Colorado Island. Nevertheless, the group reproduces something of the illusion of the humid tropics and it takes but a little imagination to conjure up other forms of gorgeous bird life, as well as the tapirs, pumas, ocelots, peccaries, and howling monkeys, all of which still hold sway on this little spot of primitive nature, past which steamers representing all centers of civilization journey every day of the year.

THE SNOWY OWL MIGRATION OF 1926-27.—Professor Alfred O. Gross, of Bowdoin College, publishes in *The Auk* for October, 1927, an account of the remarkable snowy owl migration of last winter. Both the flights and the captures of this arctic bird perhaps exceeded similar phenomena during any previous year of record. The area of the flight, as shown by Professor Gross's distributional maps, covers the entire northeastern parts of the United States and Canada, from the area of the Great Lakes to the sea. As usual, more birds were observed on the coast than elsewhere, the individual records extending southward in abundance to the southern tip of New Jersey and sporadically beyond. Great numbers also boarded transatlantic steamers at points between Newfoundland and Long Island.

Professor Gross states that among previous flights of the snowy owl during the last fifty years, the most notable occurred during the winters of 1876-77, 1882-83, 1889-90, 1892-93, 1896-97, 1901-02, 1905-06, 1917-18. It is of interest that these dates agree in large measure with those characterized by extraordinary irruptions of sand grouse, crossbills, and waxwings in the Old World, and also in certain instances with the so-called "plagues" of lemming and field mice, both in Europe and

North America. The studies of Elton and others have rather definitely linked up such extraordinary migrations of northern animals with the sun spot cycle of 11.2 years. Elton holds, moreover, that the larger invasions occur during alternate periods; that is, every 22.5 years. Actual figures are rarely in exact accord with the theoretical forecasts, but when long series of averages are used, the weight of evidence supports rhythms based upon such ordained cosmic phenomena.

CAPTIVE GALAPAGOS PENGUINS.—In the same number of *The Auk* Doctor Townsend, director of the New York Aquarium, reports upon "The Galapagos Penguin in Captivity." Several of these most interesting birds have lived for varying periods in the Aquarium, where Doctor Townsend's keen eye has been enabled to observe habits that might readily escape a naturalist in the field. The Galapagos species, which is one of the smallest of penguins, evidently spends more time at the surface than do most of the antarctic members of the family. In this respect, however, it agrees with its close relatives of the Peruvian and Chilean coasts and of the Cape region of Africa. Submerged swimming, as when in pursuit of minnows, is accomplished entirely by the flipper-like wings. When the birds drop into the water from the coping of the Aquarium tank, they do not go head first but strike flat upon their breasts. This is markedly at variance with the custom of antarctic penguins, which make beautifully graceful plunges from ledge or ice-foot. The molting period of captive Galapagos penguins occupied about three weeks, and an adult bird in good condition weighed exactly six pounds. The birds drink sea water in considerable quantity; in fact, it seems that sea water is necessary to the continued health of the birds.

CENTRAL ASIATIC EXPEDITION

THE CENTRAL ASIATIC EXPEDITION is hoping to continue its Mongolian explorations in the spring of 1928. It will be recalled that in 1926 and again in 1927 the party was blocked from entering its old field, the Gobi desert, by internal warfare and generally disturbed conditions. During these two years, however, important work by small parties has been carried on in the Chinese provinces of Szechuen, Yunnan, and Fukien. This includes paleontological and archaeological explorations by Messrs. Granger and Nelson in the first two provinces and zoological work

by Mr. Pope in Fukien. Since the spring of 1927, no work has been possible because of the intense and widespread disturbance.

The Expedition leader, Doctor Andrews, has remained at headquarters in Peking since last April. Recent letters received from him indicate that general conditions in North China are becoming much more settled and that the prospects for a renewal of the exploration are bright. It has been arranged that Doctor Andrews will cable definitely about the first of February and, if he then thinks it possible to continue work, the various members of the Expedition now in America will sail for China about March 1, arriving in Peking a month later, and will then prepare to start for the desert by mid-April.

CONSERVATION

FRANCONIA NOTCH IN DANGER.—The Franconia Notch, one of the famous scenic places of the White Mountain region of New Hampshire, noted for the immense stone profile of a human face which appears in the rocks at the top of one of the cliffs, is now in danger of ruin. The Profile House, for about fifty years one of the best and most popular of the White Mountain hotels, was burned in 1923 and is not to be rebuilt. With its destruction the financial motives for preserving the beautiful forest now clothing the sides of the notch have disappeared, and this forest, comprising some of the last remnants of the primeval spruce woods of those mountains, will become the prey of the lumbermen, unless the sum necessary to purchase it can be raised. The project for doing this includes the preservation of the beautiful Echo Lake and the Flume, a picturesque narrow gorge which attracts thousands of visitors yearly.

The state of New Hampshire has appropriated \$200,000 toward this purpose (a liberal sum considering its small population, less than 50,000), and heirs of the late James J. Storrow of Boston have given \$100,000. There remains \$100,000 more to be raised. The Society for the Protection of New Hampshire Forests, No. 4 Joy Street, Boston, Massachusetts, has undertaken the work of raising this, and appeals to all lovers of the White Mountains to send in contributions, even if only small ones.

THE ROYAL SWEDISH ACADEMY OF SCIENCE has published among its papers a descriptive map of the Hamra National Park in Sweden. The various kinds of vegetation in the Park are described by H. Andrén.

THE NATIONAL PARKS ASSOCIATION has recently published a pamphlet giving the essential facts of the war on the U. S. National Parks System and its effect on national policy. Anyone interested in this may obtain copies of the pamphlet from the Association at 1512 H Street, N. W., Washington, D. C.

FOSSIL VERTEBRATES

DR. GEORGE GAYLORD SIMPSON became assistant curator of fossil mammals in the department of vertebrate palaeontology on November 1. He obtained his degree of Doctor of Philosophy from Yale in 1926 and shortly thereafter went to Europe, under a grant from the National Research Council, where for more than a year past he has been studying the fossil collections of the various museums, paying particular attention to the Mesozoic Mammalia, the greater part of which are in the British Museum. The results of his studies upon this group of mammals will be published as one of the British Museum's Descriptive Catalogues.

Doctor Simpson was a member of one of the field parties of the department of vertebrate palaeontology working in New Mexico and Texas in 1924, and he is the author of several departmental papers dealing with the American Museum collection of Mesozoic mammals. One of these papers, written in collaboration with Dr. W. K. Gregory, describes the extraordinary mammals discovered by the Central Asiatic Expedition in the dinosaur beds of Mongolia in 1925.

HISTORY OF THE EARTH

VARVED CLAYS AT HAVERSTRAW, NEW YORK.—At the annual meeting of the Geological Society of America, which convened in Cleveland, Ohio, December 29-31, 1927, Dr. Chester A. Reeds represented the American Museum and presented a paper on the laminated clays of glacio-lacustrine origin deposited at Haverstraw, New York. During portions of the summers of 1925, 1926 and 1927, Doctor Reeds with various assistants conducted intensive field studies in this district, and collected 258 samples of the clay from various levels extending from seventy-eight feet below sea level to fifty feet above. In the autumn of 1927 the samples from different clay pits and auger holes were orientated in the laboratory with reference to their stratigraphic positions, and correlations were established for all of the material collected. After the summer and winter layers had been

differentiated, counted, and diagrammed, a total of 766 varves, representing as many years, was secured. When the bottom and lowermost layers shall have been collected, the total number of varves deposited in this area during the retreat of the ice of the last glaciation will approximate one thousand in number. The presence of quicksand, ground waters, and disturbed conditions resulting from gravitative forces hinders the ready attainment of good samples from the lowest levels.

This quantitative study of alternate deposits of sand and clay laid down seasonally in fresh-water glacial lakes is throwing additional light upon the origin of the terraces along the Hudson River and contributing to a better understanding of the fluctuating climate, varying rate of sedimentation, and number of years involved in the retreat of the ice of the last glaciation. Doctor Reeds will discuss the Haverstraw clays at greater length in a forthcoming number of American Museum *Novitates*.—C. A. R.

HONORS

PRESIDENT OSBORN RECEIVES BELGIAN DECORATION.—On November 15 the newly appointed Ambassador of Belgium, His Highness Prince Albert de Ligne, visited the American Museum to present to President Osborn the decoration of "Commander of the Order of the Crown," bestowed by King Albert. Ever since 1908, when plans were being made for the American Museum Congo Expedition, the Belgian government has given its fullest support and coöperation to the work of the Museum in Belgium's immense African colony. It seemed especially appropriate that the Prince de Ligne himself should bring King Albert's appreciation of President Osborn's services in the carrying on of prolonged investigations into the fauna of the Belgian Congo, and in encouraging the establishment of a National Park in the Kivu Volcanoes—as was first suggested by Carl Akeley—for the preservation of the mountain gorilla and all other wild life.

Eighteen years ago, when Messrs. Lang and Chapin were on their way to the Congo, the American Ambassador in Brussels, Mr. Henry Lane Wilson, introduced them to the Colonial Ministry by sending them directly to Prince Albert de Ligne, then in charge of a section of the Colonial Office. Through his kindly interest every arrangement was made to facilitate this beginning of the Museum's

studies in the Congo, the published results of which now fill a long series of volumes in our *Bulletin*. The relations between the Colonial Ministry and the American Museum have ever continued to be most cordial and fruitful in the great task of unlocking the secrets of African animal life.

Since the departure of our first Congo Expedition, the devotion of Prince Albert de Ligne to the Belgian Congo has grown steadily, although diplomatic studies have absorbed much of his time. Last year he paid an extended visit to the country around Lake Kivu, where he has acquired a considerable tract of fertile land, and is founding an important agricultural enterprise. Like almost everyone familiar with Central Africa, he longs to return, and might even now be there, had he not been chosen to represent his country at Washington. Recalling the enthusiastic support given by his predecessor, Baron de Cartier de Marchienne, to the project of a gorilla sanctuary, we must rejoice that this important post is again filled by someone with a deep attachment for both Africa and the United States, and long a warm friend of this Museum.

MEETINGS OF SOCIETIES

ANNUAL EXHIBITION OF THE NEW YORK ACADEMY OF SCIENCES.—Many years ago when natural science was a unified subject and had not yet been divided into the many specialities which exist today, the New York Academy of Sciences held each year a series of demonstrations of current research work in this broad and general field. As time went on the natural sciences were divided into different fields of endeavor and few students attempted to keep in touch with the general field. This was the natural result of the growth and development of the science of life. Recently, however, there has been felt a need to bring the research workers, in at least one or more of the fields, together, to discuss research problems in an informal manner.

Last year the Section of Biology reinaugurated the annual demonstrations of the Academy, but restricted the field to the biological sciences. The plan was such a success that a second demonstration was held this year. Thirty-seven different demonstrations were simultaneously exhibited in the large Education Hall of the new School Service Building. These were exhibits of the research work being carried on in the laboratories of Columbia University, New York

University, Washington Square College, College of the City of New York, Bellevue Medical College, Cornell University Medical College, and the American Museum of Natural History. Several hundred biologists together with a number of interested laity availed themselves of the opportunity to see and discuss current research work of other investigators. There is in New York no other medium for bringing the different groups of biologists together at a single meeting and judging from the attendance and enthusiastic reception given the demonstrations, the New York Academy is doing a great service in holding these annual gatherings. It should also be pointed out that this exhibition was made possible through the assistance and coöperation of the American Museum, for all the installations of exhibits were arranged for by the Museum.

THE AMERICAN ORNITHOLOGISTS UNION met in Washington November 15-17. During the three days' sessions sixty-six papers were read, many of which were illustrated with lantern slides or motion pictures. An all-day trip down the Potomac River to observe the water fowl brought the meetings to a close.

Officers elected for the coming year were as follows: president, Alexander Wetmore; vice-presidents, J. H. Fleming and Joseph Grinnell; secretary, T. S. Palmer; treasurer, W. L. McAtee; councilors, A. C. Beret, Ruthven Deane, Harry C. Oberholster, C. W. Richmond, and T. S. Roberts.

THE AMERICAN ANTHROPOLOGICAL ASSOCIATION met at Andover, December 28-30. Dr. H. L. Shapiro and Dr. G. C. Vaillant attended the meetings and participated in the several symposia held there.

CARDIFF NATURALISTS SOCIETY CELEBRATES DIAMOND JUBILEE.—Dr. F. A. Bather, of the British Museum (Natural History) and a Corresponding Member of the American Museum, represented the American Museum at the Diamond Jubilee of the Cardiff Naturalists Society in Wales, November 2-4.

NEW YORK BIRD AND TREE CLUB.—At the December meeting of the New York Bird and Tree Club, the keynote was conservation. Members brought substitutes for Christmas greens and decorations. Small living spruce trees with roots intact were presented to the members and their guests, and they were

requested to plant these potential Christmas trees for future generations to enjoy.

A call for new members has been extended. Expectations for the future are always based upon the experiences of the past; therefore, it is confidently expected that during the coming year some of the finest speakers will address the Club on the various phases of bird life and forestry. The meetings are held in the American Museum of Natural History.

NEW PUBLICATIONS

THE FOLLOWING PAPERS have been published in *Novitates* and the *Bulletin*, during the period from November 9 to December 24:

Novitates

No. 291. WIND AND THE DIRECTION OF INSECT FLIGHT. By Dr. Frank E. Lutz. 4 pp. November 7, 1927.

No. 292. A NEW POPLAR (*Populus pilosa*) FROM THE EASTERN ALTAI MOUNTAINS. By Alfred Rehder. With Supplemental Notes on the Distribution and Habitat. By R. W. Chaney. 8 pp. Three text figures. November 30, 1927.

*Bulletin*¹

Bulletin LVI, Art. IV. Contribution to the Knowledge of the Fossil Hyracoidea of the Fayûm, Egypt, with Description of Several New Species. By H. Matsumoto. 98 pp. Forty-three text figures. December 1, 1927.
Art. V. A Study of the Crystallography of the Calcites of the New Jersey Diabase Region. By Hebert P. Whitlock. 27 pp. Twenty-five text figures. December 9, 1927.

Bulletin LVII, Art. III. The Fishes of the Rio Chucunaque Drainage, Eastern Panama. By C. M. Breder, Jr. 86 pp. Plates I to V, 10 text figures. December 8, 1927.
Art. IV. The Chilopoda and Diplopoda Collected by The American Museum of Natural History Congo Expedition (1909-1915), with Notes on Some Other African Species. By Ralph V. Chamberlin. 73 pp. One hundred and ninety-nine text figures, 1 map. December 24, 1927.

SCIENCE OF MAN

UNUSUAL NEW BURIALS FOUND IN CAÑON DEL MUERTO.—During his recent visit to the Museum en route to Chichen Itza in Yucatan to resume excavations for the Carnegie Institution, Mr. Earl H. Morris reported on a

¹ Errata: On page 506 of NATURAL HISTORY for Sept.-Oct., under *Bulletin*, LVI should read LIV, for Articles 3, 4, and 5.

remarkable find made in the course of his work for the department of anthropology in Cañon del Muerto, Arizona. In the talus of Mummy Cave which had been worked over with considerable care in previous years, Mr. Morris unexpectedly came upon some new burials. One of these was unusual in several respects, since it is the only one known to contain both Post Basket Maker (Basket Maker III) pottery and baskets. The four baskets found in the burial were unusual in form and size, being unlike any found in the cañons during the four previous seasons of excavation there. These miniature carrying baskets are in an excellent state of preservation and are important additions to the fine collections from Cañon del Muerto already in the Museum.

THE NEW MUSEUM AND LABORATORY OF ANTHROPOLOGY.—The Board of Trustees of the newly projected Museum and Laboratory of Anthropology, the headquarters of which are to be in Santa Fe, New Mexico, met in the American Museum early in December. The main purpose of the organization is the establishment at Santa Fe of an institution for research, education, and graduate instruction in anthropology. It is planned among other things, to establish museums for public instruction, to conduct excavations, to provide laboratory facilities for research workers, and to give instruction through lectures and field demonstrations.

MRS. JOHN H. LIONBERGER has presented to the department of anthropology a fine painted elk robe. The robe was painted by the son of the famous chief Washakie of the Wind River Shoshoni about 1906 and is a very good example of Indian graphic art of that period, the decoration consisting of many figures of buffalo and horses and the representation of an Indian dance.

FOUNDER OF THE ITALIAN INSTITUTE OF HUMAN PALEONTOLOGY VISITS THE MUSEUM. The Museum, early in January, was honored by a distinguished visitor in the person of Count David Costantini, Commissioner of Public Instruction in Italy and also Founder and President of the Italian Institute of Human Paleontology.

The Count, realizing the comparatively backward state of prehistoric studies within the Italian dominions, has deliberately acquired the special knowledge requisite to an understanding of the problems of prehistory and has organized an institution which, with

royal patronage, proposes not only to review and republish the old, scattered, and more or less unknown discoveries, but to conduct new field researches both at home and abroad. On invitation of the Galton Society to address its meeting on January 6, the Count detailed the organization and purposes of his Institute, and at the same time presented a Corresponding Membership to Henry Fairfield Osborn.

—N. C. N.

AMONG RECENT VISITORS to the department of anthropology were Dr. T. F. McIlwraith, of the University of Toronto and Dr. Ralph Linton, of the Field Museum of Natural History. Doctor Linton has just returned from two years' ethnological work in Madagascar where he gathered a large collection for exhibition in the Field Museum and found definite evidence of old migrations of Malayan peoples to the Island.

THE GLOZEL CONTROVERSY.—The International Commission of Anthropologists has finally reached the conclusion that the strange mixture of Paleolithic and Neolithic finds at Glozel is a fraud. This does not mean, of course, that the Glozel dispute is ended, for there are still firm believers in the authenticity of these finds, those who consider the Commission's investigation both superficial and prejudiced.

One of the earliest observers to express doubt was a mining engineer, M. A. Vayson de Pradenne, who, in the October issue of *Les Tablettes d'Avignon et de Provence* (2^e année, No. 76), gives an interesting account of the archaeological finds and presents evidence to justify his skepticism.

First speaking of the specimens themselves, he states that after careful inspection he found marks on the bones, the polished stones and the bricks, which could have been made only with metal tools. On some of the bones the cut surface failed to show the same patina found on the rest of the exposed surface.

As to the pottery, he states that it was made by a very unskilful hand. The pieces, while very ornate, do not show any knowledge of technique, contrasting widely with primitive work known for its simplicity of form and good technique. As M. de Pradenne puts it: "A Glozel on voit que l'artiste connaît la fin, mais non le début. Il a vu le résultat et ignore le procédé."

M. de Pradenne carried his skepticism to a logical end and went digging for himself at

Glozel. He relates that while working with a knife in the clay strata he found an ornate shingle vertically placed, and by carefully sectioning the clay around it, he was able to discover the tunnel for the introduction of the object. After this discovery he visited one of the so-called "tombs," where he found another inconsistency. The walls of one of these structures was built of loose rock, poorly piled up and innocent of mortar. Despite the fact that this stonework was supposed to have been in the clay soil since Neolithic times, the interstices were not yet filled with earth, nor in fact was the clay even compact nor closed in against the stonework.

It was a sequence of such observations as these that led the Commission in its recent report to declare the whole Glozel field a fraud of the first order and not an archaeological find that would revolutionize the known history of early culture of Europe.

THE STUDY OF NATURE

EXPERIMENTAL EMBRYOLOGY.—Professor Thomas Hunt Morgan of Columbia University has recently published a monumental work on *Experimental Embryology*. His contrast between the emotional and the intellectual aspect of nature is so vivid that we may be permitted to quote in full.

A transparent egg as it develops is one of the most fascinating objects in the world of living beings. The continuous change in form that takes place from hour to hour puzzles us by its very simplicity. The geometric patterns that present themselves at every turn invite mathematical analyses. The constancy and orderliness of the whole series of events, repeating themselves a thousand-fold in every batch of eggs, assures us of a casual sequence conspiring to create an object whose parts are adjusted to make a machine of extraordinary complexity.

This pageant makes an irresistible appeal to the emotional and artistic sides of our nature. Hence, not without a feeling of jealous regret, the old-fashioned embryologists see these gems of nature consigned to test tubes for chemical analyses, to centrifuges to disturb their arrangements, to microdissecting instruments to pick them to pieces, and to endless tortures by alterations in the environment to disturb the orderly, normal course of events. For, it is the automatic self-contained perfection of the developmental process that holds our interest. Yet we feel, too, that if the mystery that surrounds the study of embryology is ever to come within our comprehension, we must try not to be sentimental and have recourse to other means than description of the passing show. The recompense, we hope, will be to substitute a more intelligent

interest in place of the older emotional response to the order of nature.

THE ATTACK ON THE GENE.—Prof. Frank R. Lillie, of the University of Chicago, has recently published in *Science* an address which he gave last summer at Woods Hole.

The great problem in biology is not so much an identification of the hereditary units as genes, but the determination of the nature of these factors and the elucidation of how they do their work. To quote from Professor Lillie's presentation:

The method of comparing the action of varieties of gene combinations upon known characters of the organism under constant or varied conditions of the environments is the oldest method of analyzing the mode of action of genes in development, and it appears to me to be the most promising method at the present time. . . .

Morgan's conclusions that a single gene may be concerned in a multiplicity of characters, both in time and in space, and that a multiplicity of genes may be concerned in each character are indeed steps towards simplification. . . .

Physiology of development and genetics both teach us the same lesson, viz., that at the foundation of every phenotypic event there is an unanalyzed ontogenetic process, which expresses itself in time by qualitatively different types of reaction whether to the environment, or to the gene, or to both combined.

It is the analysis of the action of the gene during the ontogenetic processes, or, in other words, during development, that Professor Lillie recommends for detailed study.

NEW MEMBERS

SINCE the last issue of NATURAL HISTORY the following persons have been elected members of the American Museum, making the total membership 10,021.

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THE FISH NUMBER

JANUARY-FEBRUARY

The first number of **Natural History** for the new year will be devoted to the subject of fishes. The contributions include "A Tour of the New Fish Hall" by William K Gregory; "Carl H. Eigenmann, 1863-1927" by George S. Myers; "A Barn-door Skate with Abnormal Pectoral Fins" by Lewis Radcliffe; "A Color Figure of the Louse-fish" by E. W. Gudger; "Habits and Life History of the Angler Fish" by Ulric Dahlgren; "Big Game Fishing in New Zealand Seas" by Zane Grey; "On the Association of the Common Goby with the Oyster, with One Case of Parasitism" by Thurlow C. Nelson; "Something about Flying Fishes" by John T. Nichols and C. M. Breder, Jr.; "The Zane Grey Game Fish Collection" by Francesca La Monte; "The Shepherd Fish and Its Strange Pasture Lands" by G. H. Parker; "Fishing for the Oilfish" by Charles B. Nordhoff; "In Southern Waters After Bonefish" by Van Campen Heilner; and "The Versatile Gurnard" by William Beebe.

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